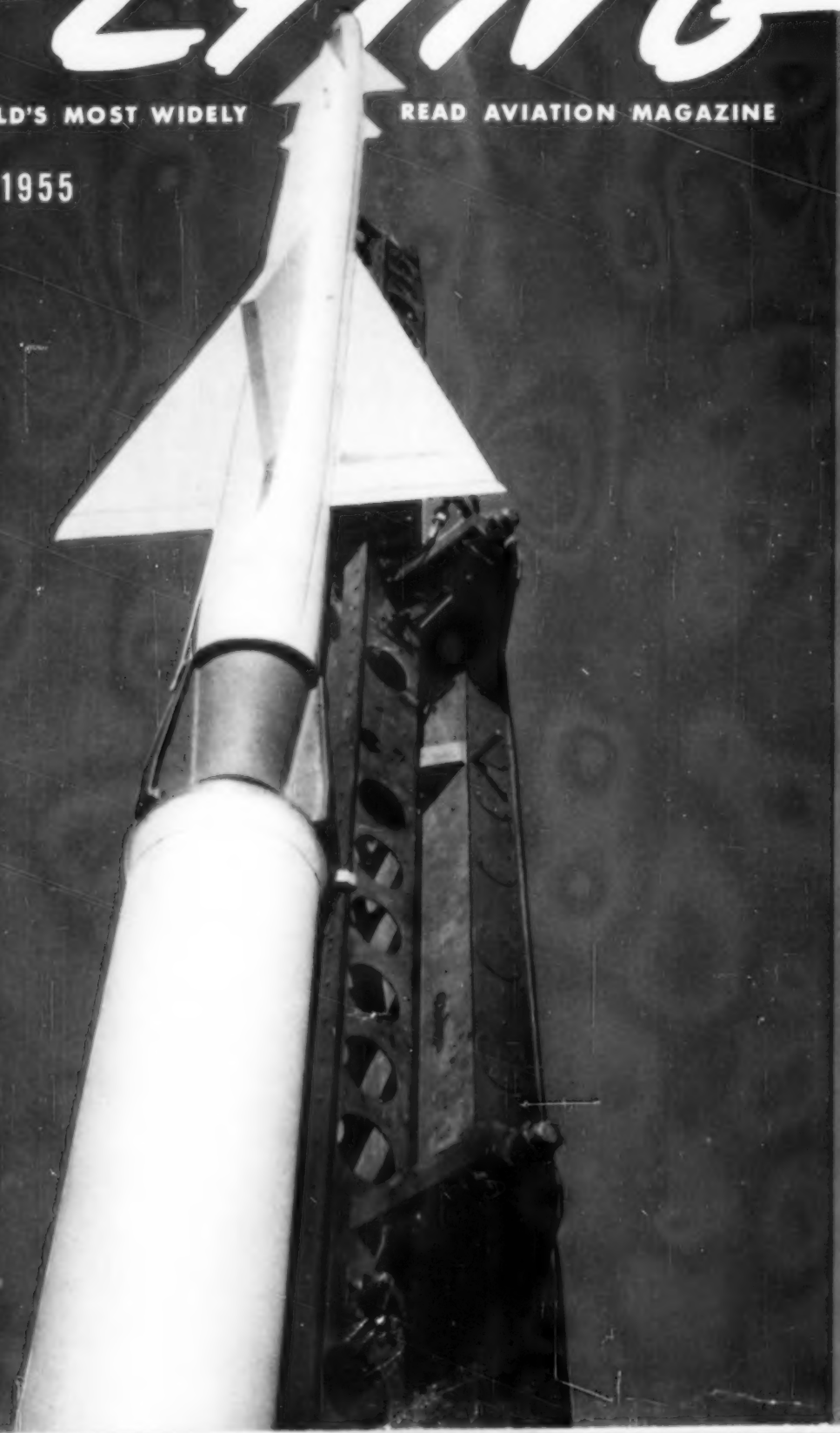
FLYING

THE WORLD'S MOST WIDELY READ AVIATION MAGAZINE

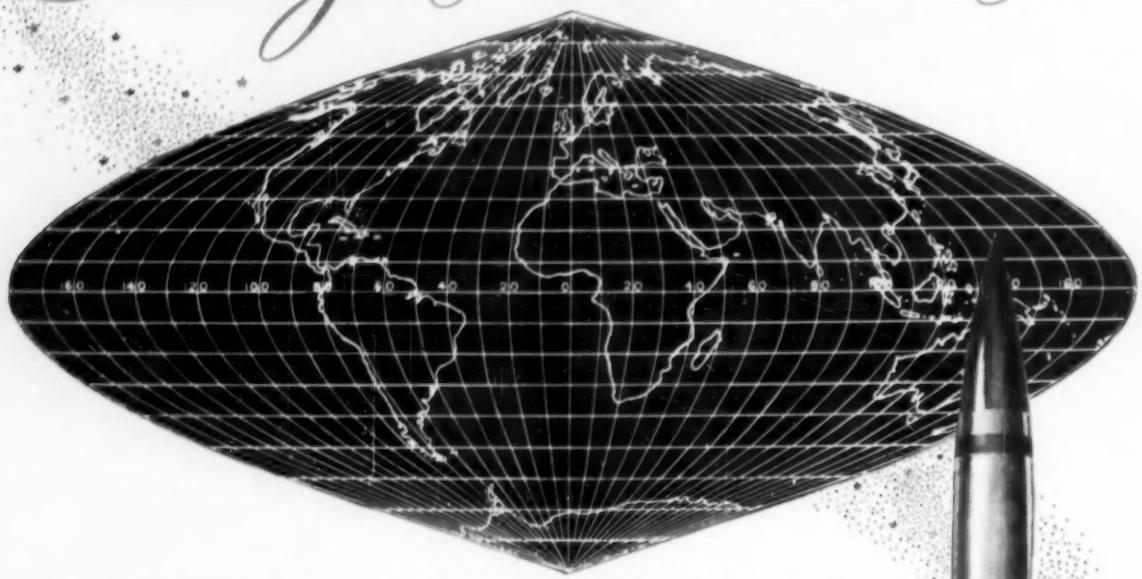
NOVEMBER, 1955
35 CENTS
In U. S. and Canada

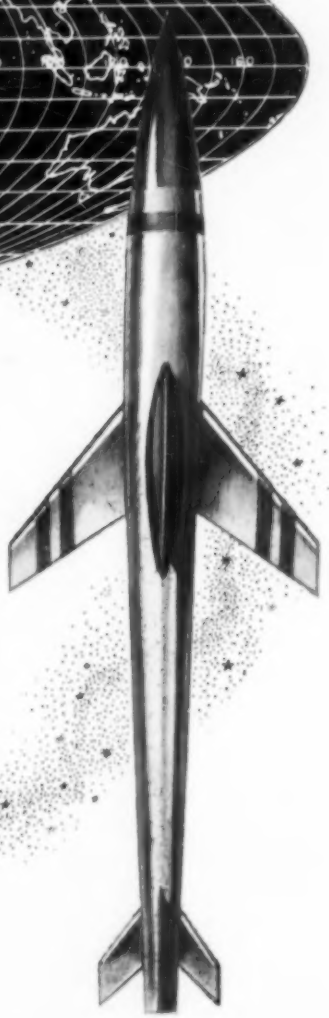
MISSILE REPORT



Douglas
Surface-to-Air
"NIKE"

Ten Years That Changed the World





History records no more radical changes in the military sciences than those of the past decade. The period 1945-1955 saw not only the advent of nuclear weapons but, equally important, new systems of defense and new means of offense – guided missiles.

Just ten short years ago guided missiles were only a visionary concept. Today they are on the verge of becoming the base on which the security of Western Civilization and the peace of the world will rest. Although largely masked by the necessities of military security, tremendous strides are being made by all the branches of the U. S. Armed Forces in this crucial period.

The Fairchild Guided Missiles Division is proud to have a part in the missile programs of our Armed Services. Starting in 1945 with the first of this country's true guided missiles – the Navy's surface-to-air "Lark" – the Fairchild Guided Missiles Division has been continuously engaged in designing, developing and producing missiles, radar and associated equipment. It has supplied missiles and missile weapons systems to the Navy, the Air Force and the Army.

In the years ahead, Fairchild can be counted upon to continue its role as one of the leaders in our missiles program.

"where the future is measured in light-years"

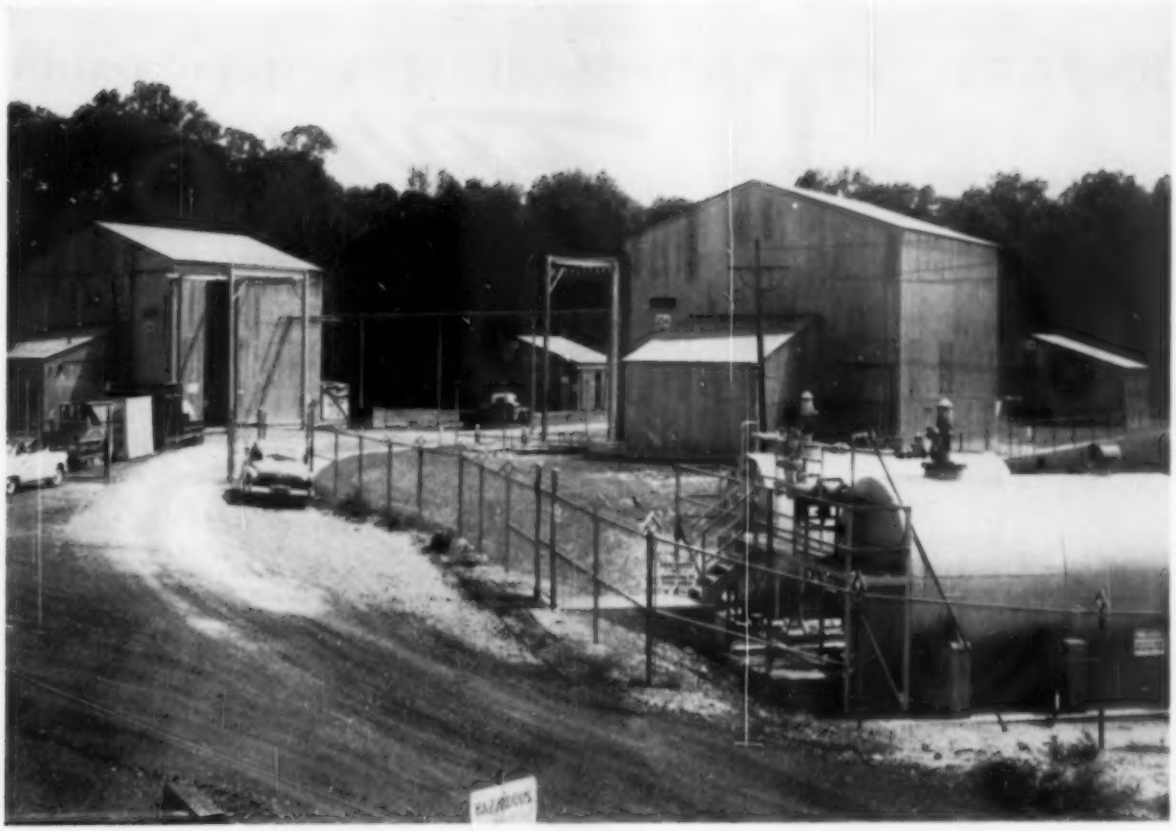
ENGINE AND AIRPLANE CORPORATION

FAIRCHILD

Guided Missiles Division

WYANDANCH, L. I.

Other Divisions: Aircraft Division, Hagerstown, Md. American Helicopter Division, Manhattan Beach, Calif.; Engine Division, Farmingdale, N. Y.; Kinetics Division, New York, N. Y.; Speed Control Division, St. Augustine, Fla.; Stratos Division, Bay Shore, N. Y.



ENGINEERS CALL IT

"Providing Environments"

How Goodyear's Wingfoot Lake test facilities are providing foolproof Fuel Systems for today's Aircraft and tomorrow's.

A development man at Wingfoot Lake can turn a valve and subject a proposed high-flying jet's fuel tank to the cold of −110°F.

He can throw a switch and set in motion a machine which tries to shake a tank and fittings to pieces.

Out in the yard you can see "pillow" tanks built of special fabric — standing the test of nature and weather in the broiling sun.

At night you can see tracers and 20 millimeter shells flying into self-sealing fuel tanks.

Leading in and out of the buildings you can see a maze of various colored pipes — piping "hot and cold running gasoline" of every type to exhaustive tests.

Soon there will be something else: hi-temperature tests which simulate high-speed aircraft under conditions of Mach 1, Mach 2 and Mach 3, to study the effects of skin friction.

All this — and more — is part of the Goodyear investment which enables us to provide fuel and oil cells, systems and fittings which comply with the military specs on quality control.

It is part of the progressive pioneering which has placed Goodyear Aviation Products to the fore in the development of systems for handling and stowing today's special aviation fuels and missile propellants. *They can do much to accelerate the progress of your project.*

For full information, write: Goodyear, Fuel Cells Department K-1723 Aviation Products Division, Akron 16, Ohio and Los Angeles 54, California.

GOODYEAR AVIATION PRODUCTS

FACILITIES + ABILITIES = EXTRA *plus* IN PERFORMANCE

NOVEMBER, 1955 VOLUME 57, NUMBER 5

FLYING

Reg U. S. Pat. Off.

WILLIAM B. ZIFF (1898-1953) FOUNDER

GILL ROBB WILSON
Editor and Publisher

C. L. HAMILTON
Managing Editor

MARJORIE M. GRAY
Production Editor

FIL GIULIANO
Art Director

A. M. COURTNEY
Editorial Assistant

ROBERT B. PARKE
Advertising Manager

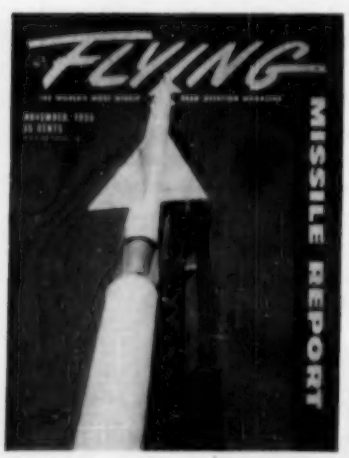
Ziff-Davis
Publishing Company

B. G. DAVIS
President

H. J. MORGANROTH
MICHAEL H. FROELICH
Vice-Presidents

GEORGE E. CARNEY
Secretary-Treasurer

MICHAEL MICHAELSON
Circulation Manager



COVER: U. S. Army photo of guided missile, *Nike*, at White Sands Proving Ground. See "Missile Report," page 28.

CONTENTS

Armistice, *An Editorial* 18

The World Must Listen to Airmen . *Lord Malcolm Douglas-Hamilton* 20

Shoopie's Sabre Swingers . . . . . *Ed Mack Miller* 22

When Your Engine Quits at Midnight . . . . . *Jesse W. Stonecipher, Miller R. Green, Richard E. Mankus* 24

Small Planes and Big Cities . . . . . *Floyd Beaver* 27

Missile Report . . . . . *Martin Caidin* 28

Shades of the Buffalo . . . . . *Francis Dickie* 34

When Is a Tie-down? . . . . . *Wayne Brown* 36

Sondrestrom . . . . . *Dr. J. Douglas Baird* 38

Hangar Flying 40

Flivver Check List . . . . . *Ted Durosko* 42

Visibility—On the Button . . . . . *David E. Williams* 43

Americans All 44

I Learned About Flying From That! No. 189 . *Robert R. Brackett* 48

FLYING FEATURES

Mailbox . . . . . 6 Flying Calendar 16

Briefings . . . . . 10 Have You Seen? 46

AOPA News 58

Index to Advertisers . . . . . 80 Photo Credits 80

Member of the Audit Bureau of Circulations

Ziff-Davis Publishing Company Editorial and Executive Offices, 366 Madison Ave., New York 17, N. Y.
Branch Offices: 64 E. Lake St., Chicago 1, Ill.
Statler Center, 900 Wilshire Boulevard, Los Angeles 17, Calif.

SUBSCRIPTION SERVICE: All subscription correspondence should be addressed to Circulation Dept., 64 E. Lake Street, Chicago 1, Ill. Please allow at least 4 weeks for change of address. Include your old address as well as new—enclosing if possible an address label from a recent issue of this magazine.

CONTRIBUTIONS: Contributors are advised to retain a copy of their manuscripts and illustrations. Contributions should be mailed to the New York Editorial Office and must be accompanied by return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Any copy accepted is subject to whatever adaptations and revisions are necessary to meet the requirements of this publication. Payment covers all author's, contributor's and contestant's rights, title, and interest in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.

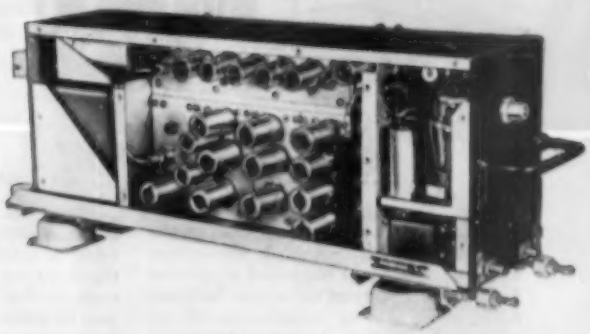
FLYING is published monthly by the Ziff-Davis Publishing Company, William B. Ziff, chairman of the board (1946-1953), at 64 E. Lake St., Chicago 1, Illinois. Entered as second-class matter Sept. 8, 1942, at the Post Office, Chicago, Ill., under the act of March 3, 1879. Authorized by Post Office Department, Ottawa, Canada, as second class matter.
SUBSCRIPTION RATES: One year U. S. and possessions, and Canada $4.00; Pan American Union Countries $4.50; all other foreign countries, $5.00.

Copyright 1955 by Ziff-Davis Publishing Company. All rights reserved.

SPECIAL REPORT

ON NEW RADAR SAFETY BEACON

An announcement of vital interest to airline and corporate aircraft management, engineering and flying personnel, concerning a significant contribution toward greater safety and efficiency of operations.



HERE AT LAST! Wilcox is proud to announce the acquisition of the exclusive, world-wide manufacturing and distribution rights for the airborne Air Traffic Control Transponder (Wilcox Model 714 Radar Safety Beacon) designed by Melpar, Inc., (subsidiary research organization of Westinghouse Air Brake Company).

The unit is the result of three years of intensive research by Melpar engineers under the direction of Vernon Weihe and Robert Boymel. It was designed to ARINC characteristic No. 532.

It promises far more effective Airport Surveillance Radar, especially in view of the fact that CAA is now equipping major traffic centers with ground interrogators.

ASR HAS HAD PROBLEMS. Airport Surveillance Radar has been hindered by the difficulty of getting quick, positive identification of each aircraft on the radar scope. Target surfaces are often not large enough for good indication. Bad weather affects readings. Identification has been possible only by time-consuming flight maneuvers.

BUT NOW, THE SOLUTION IS HERE! The Wilcox Model 714 RADAR SAFETY BEACON erases most limitations of ASR. It's an inexpensive airborne transponder. A signal from the ground radar hits equipment in the aircraft, triggers a transmitter which sends the coded signal back. Good, clear, strong indications on the radar scope are virtually unaffected by sleet, snow, thunderstorms, congested traffic conditions at all distances up to the limit of radar range, on all types of aircraft!

THE WILCOX RADAR SAFETY BEACON TAKES A BIG LOAD OFF THE PILOT'S BACK! How? Say you're a pilot of an aircraft equipped with the Wilcox Model 714 RSB...

1. You know your aircraft is positively identified!
2. You don't have to go through flight maneuvers!
3. You are provided with extra measures of safety in busy terminals, in border-line weather conditions, where IFR and VFR traffic mix!
4. You know your aircraft will be in a precisely defined section of air space—preventing collisions!
5. You land faster. Wilcox RSB makes greater accuracy of landing interval control possible. More planes land per runway per hour!
6. You know the pattern is more flexible! Errors in speed or position can be spotted and corrected faster. The radar man can pull you out of the pattern and land you—even at a strange airport—quickly—in case of emergency!
7. You merely request that a code be assigned you when flying over an Air Defense Identification Zone (ADIZ). You are identified during the entire time you're in the area.

HAS IT BEEN PROVED? Several thousand hours of flight time have been accumulated on the Wilcox Type 714 Radar Safety Beacon by Lake Central Airlines! They installed six prototypes on aircraft operated in regular scheduled service.

WHEN CAN YOU GET THEM? Production and delivery is scheduled for late 1955. This gives you ample time to install, coinciding with CAA schedule for interrogators now being installed on ASR radar at major terminals.

WRITE, WIRE OR PHONE FOR COMPLETE DETAILS!
Send for descriptive literature on the Wilcox Type 714 Radar Safety Beacon. Contact Wilcox Electric Company, Fourteenth and Chestnut, Kansas City 27, Mo. BEnton 0700.

wilcox
ELECTRIC COMPANY, INC.
Fourteenth & Chestnut
Kansas City 27, Missouri, U.S.A.

MAILBOX

NATIONAL FLYING CLUB

In your June issue you published a letter from me in which I commented on the trials and tribulations of a serviceman who wants to fly. I suggested a national flying club, using just the words "national flying club" . . . no embellishments, no further explanation. I am now convinced that those words are magic. I have received a flood of mail from all corners of the United States and from Canada, France and Japan.

The most amazing thing about the letters, next to their abundancy, is the enthusiasm expressed in each one. In fact, if there is a single individual who is opposed to a national flying club, I have yet to hear from him. I am almost afraid to ask you to print some of the ideas which have been advanced . . . we may have a popular response akin to a revolution. But maybe that is just what private flying has been needing.

First, it is obvious now that the club must be organized for all persons, not just for those of us in service. I have found that there are probably as many civilians who would like to see a national club organized as there are military people.

Next it is suggested that lowest cost and maximum utility will be obtained through: (a) no dues or fees of any kind after initial fee; (b) no financial hardship to relocate; (c) extra plane available when necessitated by growth, without additional assessment; (d) wide variety of aircraft available from national club for long trips.

It is further suggested that a "packaged private" instruction plan be offered and that high school clubs be sponsored to encourage flying among young men and women.

These are only a few of the many features of the proposed club. I will be prepared shortly to answer all requests for information with a form letter incorporating many of the ideas that have been sent to me. The club is still in the formative stage and all comments, critical as well as favorable, on the general idea of a national flying club are solicited.

CAPT. JAMES A. ROSS, JR.
1107 West Green St.,
Urbana, Illinois

● *As Captain Ross has indicated, there is widespread enthusiasm for a national flying club. However, while enthusiasm is important, it is not enough to put such a show on the road. Captain Ross will need all the help he can get. In the meantime, he has proposed writing an article on the subject which we will publish in a future issue.*—ED.

YOUTH AND THE LAW

I have just read your August editorial about American youth not being interested in aviation. I have also read that there are not many boys working at airports in this country. But did you ever stop to think that in many states it is illegal to work at an airport under the age of eighteen? I live in New Jersey and until recently had a part time job at a seaplane base to earn flying lessons. This summer I managed to get a full time job there. I applied for working papers and was turned down because it was considered a hazardous job. My mother did all she could to obtain a waiver from the state to allow me to work there, but it was impossible. Just wanted to bring this to your attention. It may be one of the reasons for "the lack of interest in flying" on the part of young people in this country.

DAVID C. FAULKNER

Englewood, N. J.

IFR TRAFFIC

I have just read the "I Learned About Flying From That" article in the August issue. That article and others like it published in various private flying magazines give me cause for alarm. The pilots writing these articles, generally lightplane pilots with limited weather experience, talk of letting down or climbing up into the overcast with no thought of traffic or an ATC clearance. They evidently don't realize the amount of IFR traffic both on and off airways these days. They don't even seem to know they are violating the regulations. It seems to me there is a great need for an educational campaign to impress all pilots of the great danger to themselves and others when flying into instrument conditions, even for a minute or two, without a clearance.

WILBUR ADAMS

Cincinnati, O.

WARNING!

After reading your article about Baja California entitled "Pilots' Paradise," I became all enthused and decided to make at least part of the trip in my PT21 Ryan. Was to leave Compton, Calif., early on a Saturday morning and would have till Monday afternoon to return.

Morning of the trip found the field socked in. I killed time until 5 p.m. when the weather cleared somewhat, so called San Diego weather who informed that vis. was 9 mi., ceiling 3,000; so grabbed my friend Bud and got for going. Well sir, the vis. was 9 miles alright, but the ceiling was 900 feet at San Diego.

We landed at Lindbergh Field in San Diego and filled out a card of departure provided in a box outside the customs office, as the department was closed.

Now this section of California is not new to me and ordinarily from 1,500 feet you can see the town of Tijuana. But the ceiling was steadily getting worse and we had a bit of trouble finding the Tijuana airport where I landed. We decided to stay overnight and continue the trip in the morning, weather permitting.

The Mexican customs officials were very business like and courteous and all charges together amounted to about $3.60 American money.

We had a rough time getting a room in Tijuana as we discovered that it was the weekend of the "Big Bool Fight," and the city was loaded with Americans being parted from their money. The weather next morning was just exactly the same but our pocketbooks were not. We decided to go back to our own country where prices are down to earth.

On landing at Lindbergh Field again, we were told to wait and the tower operator called the customs man at his home. After about an hour, he showed up and, after borrowing a key to the office from a guard, had me fill out a couple of cards and then looked the plane over. Taking me back in the office, he demanded $46.56. I was sure he was joking, but he assured me he was not. His manner was one of daring me to say anything, and threatened confiscation of my plane.

Now I ask you, if you were aware of this condition why couldn't the facts of charges for inspection on holidays and weekends be *published* so that airplane poor people like myself who only get to go somewhere just those days could be warned?

DELMAR P. LEONARD

Compton, Calif.

● *We have warned, and warned, and warned readers about the overtime charges made by customs at U. S. entry ports. Seems as though folks just have to find out for themselves. As for doing something about the matter, we can only suggest that you place the facts before your Congressmen.*—ED.

SOUTH AFRICAN RANCHER

For nearly a year I have been a subscriber to FLYING and really enjoy reading it as through your magazine I have learned to understand something of the true American spirit.

I would be very glad if some of your readers in the States would be so kind as to write to me. I am a ranch owner and also grow "mealies" on a large scale—or as it is called in America, "sweet corn" or "maize." I am quite keen on flying; our club owns a Taylorcraft and a *Bonanza*, and there is an excellent landing ground

(Continued on page 65)

AIR ASSOCIATES, INC.
TETERBORO, NEW JERSEY

J. E. ASHMAN
PRESIDENT

10/20/55

MEMO

To: Sales Managers:

Electronic Equipment Division, Orange
Aircraft Products Division, Teterboro

Branch Managers:

Chicago	Glendale	Atlanta
Dallas	Miami	Teterboro

Please give special attention to assure that air travel reservations made by your department are utilized as scheduled or cancelled in sufficient advance to permit resale of the space by the airlines.

The prosperity of our Company depends upon the economic stability of every element of aviation. It is to our interest to assure that airline revenue is not unfairly curtailed by "no show" reservations. My air travel experience over the last several months leads me to believe that the "no show" is becoming a serious threat to airline economy.

In case of last minute cancellations due to unavoidable emergency, please call the airline in question at earliest possible moment. In no case must a "no show" without explanation of the emergency appear on the daily travel log of your division.

J. E. Ashman

EVER LAND A JET ON A

U.S. NAVY'S TOUGHEST PILOT-TRAINING PROBLEM MADE EASIER BY WORLD'S SAFEST JET TRAINER.

LOCKHEED **T2V-1**

Once you try it, you know there's nothing trickier than setting down on a carrier at jet landing speed. Add fickle winds to a pitching, yawing, rolling deck, and there's plenty to think about, especially during early training.

That's why the Navy needed the world's safest two-place jet trainer. It's now in production at Lockheed.

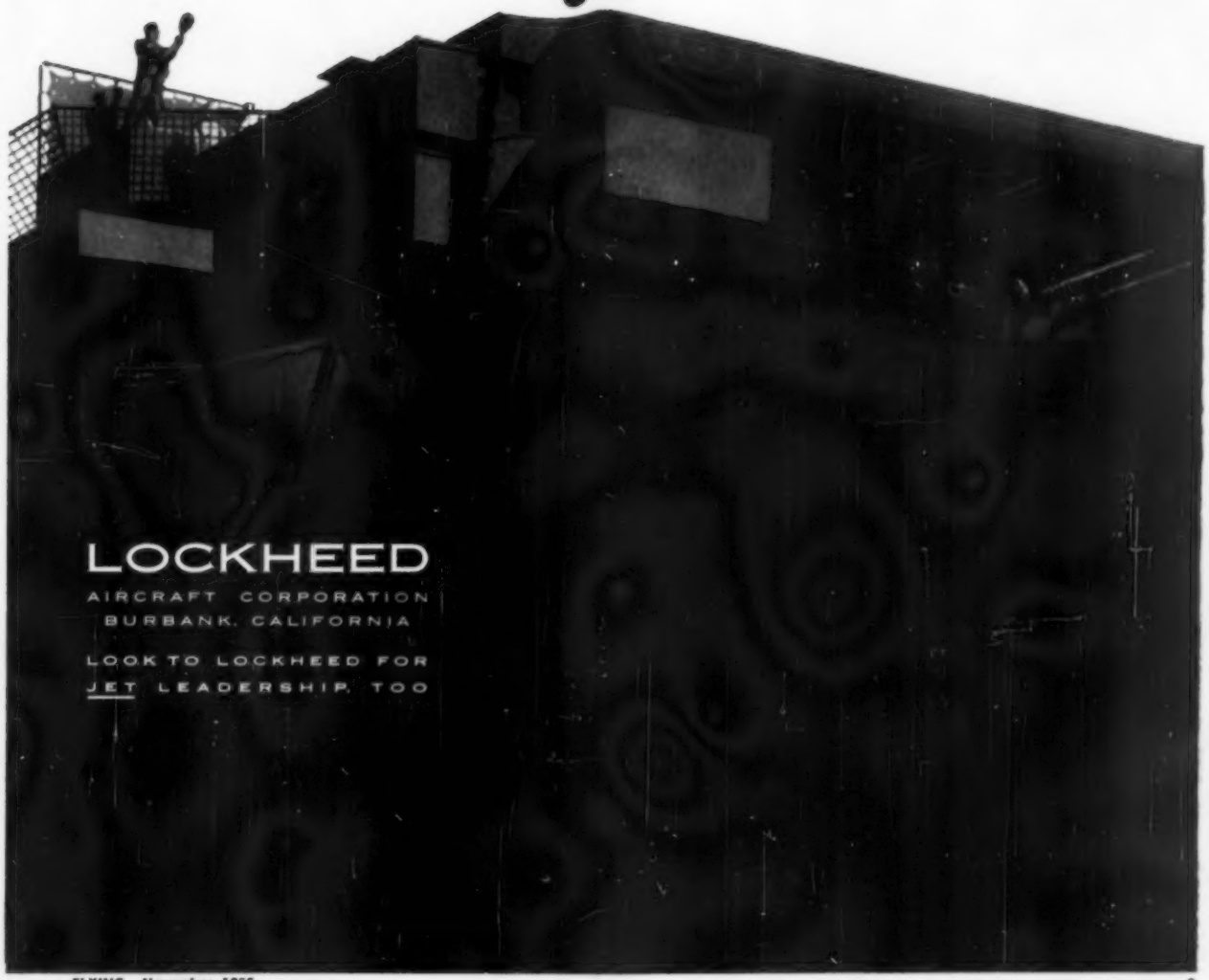
The T2V-1 is the slowest-landing high-performance jet ever built—lands at less than 90 knots yet flies at close to 500 knots. It's the first U.S. plane ordered into production utilizing Boundary Layer Control.

With "BLC," compressed air from the engine is shunted into the wing, then blasted through tiny holes over wing flaps. This causes air flow to hug flap surfaces. *Result:* increased lift for safe landings at lower speed, shorter takeoff runs.

Other innovations of America's first carrier-based jet trainer: aerodynamically actuated slats on the wing's leading edge for better low-speed stability, elevated rear seat for fuller vision, a simplified and roomier cockpit, high-capacity landing gear.

The Navy T2V-1 is a result of Lockheed's unmatched experience in building over 4,000 jet trainers—starting with the T-33, the world's first operational jet trainer.

FLATTOP?



LOCKHEED

AIRCRAFT CORPORATION
BURBANK, CALIFORNIA

LOOK TO LOCKHEED FOR
JET LEADERSHIP, TOO

Briefings . . .

LARGEST OFFICIAL registration for any civil aviation function ever held in the United States occurred at the Air Force Association national convention for 1955 in San Francisco where it was reported that some 2,300 registered.

ADMIRAL ROBERT B. CARNEY, former Chief of Naval Operations, has been elected a member of the Board of Directors of the Fairchild Engine and Airplane Corp. James A. Allis, Chairman of the Board stated: "We are particularly pleased that Admiral Carney has consented to serve on the Fairchild board because of his long experience in international relations and in logistics planning."

BEWARE OF MULTI-ENGINE jet planes! A CAA airways flight inspection pilot has attempted following a B-47 at various distances to determine the effects of jet wash on lighter aircraft. At one mile his *Twin-Beech* was violently uncontrollable; at two miles it was uncontrollable; at three miles it was in violent turbulence, and at four miles control was barely possible.

GROOMING THEIR "HORSES," two Texas cowboys attend to their mounts at the end of a day's roundup. While one curries his registered Palomino, the other

polishes his certified Bell helicopter before bedding them down for the night. The picture was taken at a large Texas ranch where one helicopter does the work of 20 cowpokes.

SOUTHWEST AIRMOTIVE has signed contracts totaling nearly $2,000,000 with the City of Dallas, paving the way for creation of a new aircraft service facility which the company predicts "will be the finest of its kind in the world." The new facility will include a 900-foot long structure housing lounges, lobby, flight operations room, coffee shop, aircraft, radio and instrument shops, resident aircraft storage, and private hangar and lounge facilities to be leased by Southwest to Dallas fleet owners.

SHOWING THEIR INTEREST in aviation, the people of Denver have passed a bond issue of $400,000 for building large hangars for fixed-base operators and T-hangars for individual aircraft owners at Denver Municipal Airport. A committee has recommended 200 T-hangars and 4 large fixed-base operator hangars.

THOMPSON TROPHY for 1955 went to Col. Horace A. Hanes for a new world speed record of 822.135 mph, made in a North American F-100C at Palmdale, Calif. Fred

Crawford (left) president of Thompson Products, presented the trophy to Col. Hanes at the National Aircraft Show.

EXCLUSIVE WORLD-WIDE manufacturing and distribution rights have been acquired by Wilcox Electric for the airborne Air Traffic Control Transponder (radar safety beacon) designed by Melpar, Inc., subsidiary of Westinghouse Air Brake Co. Production and delivery is scheduled for late 1955 to coincide with the CAA schedule for interrogators to be installed on Airport Surveillance Radar at major terminals. The equipment provides positive aircraft identification in areas of congested traffic and when flying in ADIZ's.

RIGID EVALUATION tests have been given the MS 760, world's first four-place light jet airplane, by the Royal Canadian Air Force, according to Beech Aircraft Corporation which holds an option on exclusive right to manufacture and sell the French jet in North America.

CIVIL AVIATION, traditionally represented at the National Aircraft Show by swarms of visiting private aircraft, was conspicuous for its absence this year. Due to jet traffic and lack of parking space at Philadelphia International Airport, visiting planes were to be taken care of at North Philadelphia Airport, their pilots and passengers to be shuttled via United Air Lines to International. Everything was ready for handling about 2,000 planes. It is reported that some 200 showed up throughout the three day period of the show.

A MECHANICAL MOP capable of sucking up 500 gallons of water from flooded runways has been developed in England by Cimex-Fraser Tuson Ltd. The machine has been evolved from the turf-drier used on cricket fields in Britain when rain stops play. Vickers-Armstrong, makers of the *Viscount* turbo-prop airliner, was among the first to place an order for the drier.

CESSNA HAS ESTABLISHED a wholly owned subsidiary company known as National Aero Finance Company, Inc., to assist the Cessna dealer organization in the U. S. and Canada in financing its aircraft operations. Financing programs for demonstrators, stock airplanes, and leased airplanes are being offered Cessna dealers. With Cessna aircraft sales volume running 80 per cent over last year, the financing needs of dealers has been sharply increased.

NEW YORK'S WEST SIDE Airlines Terminal brings travelers within just 21 minutes of Newark airport, as compared to about 25 minutes to LaGuardia and 45 to Idlewild from the East Side Terminal. Such surface travel time puts the New Jersey airport more completely in the New York air travel picture than at any time since the opening of the Long Island fields.

AIRLINE TRAVELLERS in Australia, whether they like it or not, will soon be flying backwards in the interests of safety. The Australian Civil Aviation Department has ordered all airlines in the country to turn their passenger seats back-to-front by January, 1957.

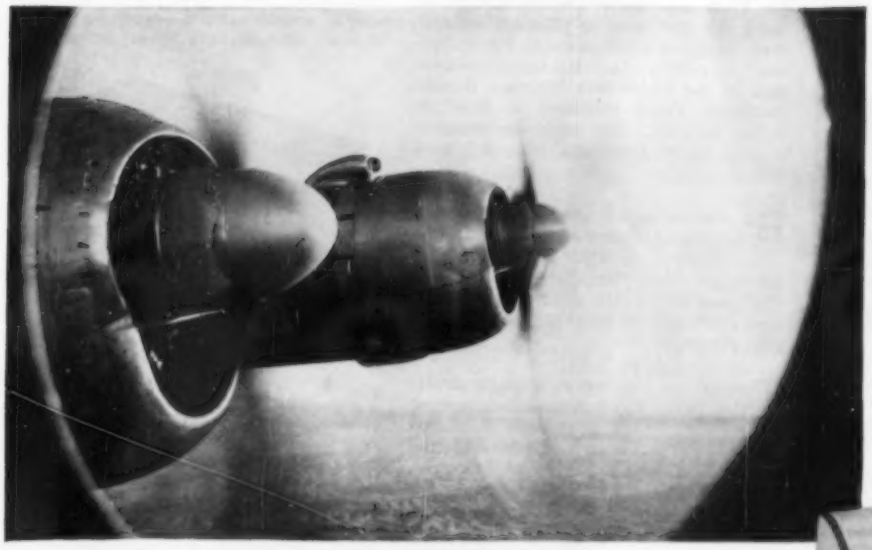
ULTIMATE PLANS of New York's Port Authority are to build a heliport along the city's Hudson River dock area. Although New York Airways is providing

regular passenger and mail helicopter service between airports and suburban areas, the city as yet does not have a downtown heliport.

STALKING A TROPICAL STORM at night has been accomplished for the first time by USAF Hurricane Hunters. Capt. Fran-

(Continued on page 12)

FLY WEATHER-WISE



These weather items prepared in consultation with the United States Weather Bureau

Rain drops from heavy cumulus clouds which fall from colder altitudes may cool cylinder heads enough to cause engine to misfire. Avoid heavier showers wherever possible.

Unlike showers, rain falling from stratified cloud layers may be warmer than the air through which it falls. Be prepared for poor visibilities in the cold air near the ground, as fog is likely.

To avoid turbulence along squall lines, plan your trip through the northern quarter of an active low. Although instrument conditions and ice in the winter may be encountered, the severest weather will be avoided.

Even though stations report good weather—conditions in between are occasionally poorer. You may be unable to maintain visual contact. Check all available information on en route weather as well as your terminal weather.

Best Pair to Get You There

STEERING CLEAR of stormy weather can add miles to your flight. Weather-wise pilots safeguard themselves with an extra margin of safety...keep tanks filled with Mobilgas Aircraft... protect engine performance with Mobiloil Aero. These famous products are the result of 89 years of research and experience—favorite with aviators since the Wright Brother's first flight. Why accept less for your plane?

Mobiloil AERO

Mobilgas AIRCRAFT

SOCONY MOBIL OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

TO THE MAN WHO WANTS TO BE AN AERONAUTICAL ENGINEER

If you are one of the many ambitious men who would like to "get into engineering" . . . but cannot afford the time or cost of four years or more in college . . . this message is for you.

You can get into the aeronautical engineering field, with a genuine engineering job and pay, after two years of training at Northrop Aeronautical Institute.

AT NORTHROP, you take an intensely practical, "no frills" course. Your instructors are "production-conscious" with practical experience in the aviation industry. Many have been major executives of the largest airplane companies.

NORTHROP GRADUATES have attained many top aeronautical engineering jobs. Time and again, aircraft firms have offered to hire the entire graduating class at Northrop. There actually is a waiting list for Northrop graduates.

Many Northrop students work part-time, usually for aviation concerns.

THIS IS YOUR OPPORTUNITY

Join the many Northrop graduates who are highly paid key men in the industry. As your first step toward success, write for complete information. Mail coupon below. Do it today!

Northrop
Aeronautical Institute
An Accredited Technical Institute
1119 W. Arbor Vitae Street
Inglewood 1, California

NORTHROP AERONAUTICAL INSTITUTE
1119 W. Arbor Vitae Street, Inglewood 1, California
Please send me immediately the Northrop catalog, employment data, and schedule of class starting dates. I am interested in:
- ☐ Aeronautical Engineering Technology
- ☐ Aircraft Maintenance Engineering Technology
- ☐ Master Aircraft and Engine Mechanic
- ☐ Jet Engine Overhaul and Maintenance

Name ..... Age .....
Address .....
City ..... Zone ..... State .....
Veterans: Check here ☐ for Special Veteran Training Information.

Briefings . . .

(Continued from page 10)

cis E. Wilson holds the distinction of being the first man to pilot his aircraft into the eye of a hurricane at night. The feat was accomplished on a hurricane mission of the USAF 59th Weather Reconnaissance Flight stationed at Kindley AFB, Bermuda. The night penetration was made on hurricane "Connie" in a WB-29.

BE SURE TO CHECK aircraft fuel before leaving an airport, especially after the airplane has been tied down or stored overnight. Utah Aero-News reports several cases of complete draining of aircraft fuel tanks and of breaking into aviation fuel pumps.

TROPHY FOR BEST EQUIPPED plane at the New Jersey Pilots Association meet at Ocean City, N. J., is proudly displayed by Mrs. Marion Hart. Her prize winning *Bonanza* was the same plane she flew to Europe and back in 1953. Congratulatory grin in the background is worn by Ed Nilsson, eastern sales manager of Lear, Inc.

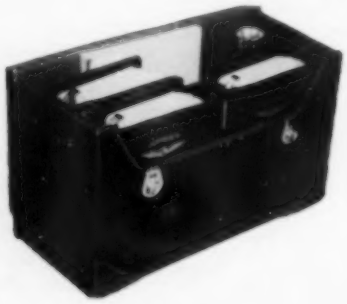
ADVANTAGES OF A POSSIBLE London-Tokyo route through Moscow and Mukden are being considered by British Overseas Airways Corp. Such a route would be about 6,500 miles, compared with 10,150 via the normal Pakistan-India routing. It is also shorter by more than 2,000 miles than the Polar routing over Greenland and North America.

CAA'S PROGRAM for operation of the Federal Airways for fiscal 1956 provides for continuation of all major facilities now in operation, plus commissioning during the year of 22 omni ranges, assuming the cost of 3 airport control towers, 3 airport surveillance radar (ASR) and some expansion of radar services at Eastern ASR locations.

FIRST JET PLANE to be built in Spain is now in flight test stage. It was built by Hispano Aviacion Aircraft Construction Co. It is noted that the German designer Willi Messerschmitt has been connected for some years with the embryonic Spanish aircraft industry.

ROYAL AIRCRAFT has begun production and marketing of its five-place Royal *Gull* amphibian. Vest Aircraft of Denver, Colo., has been appointed western representative, covering 11 states, Mexico and Alaska. Vest has purchased the first demonstrator and arrangements for two more have been made. The plane is powered by two Lycoming 270-hp engines equipped with full-feathering Hartzell props.

DESIGNED FOR MAXIMUM accessibility in the cockpit, Jeppesen's flight case, "The Pilot," has cut-out front for easy access; accomodates 4 Jeppesen Airway Manual binders plus space for extras;



semi-adjustable partitions; drag and lift type handle at each end; holders for pencils, plotter and computer. Price $28.75 through Aviation Sales Division, Jeppesen & Co., Denver, Colo.

PETER G. MASEFIELD resigns his post as Chief Executive of British European Airways on October 31st to become Managing Director of Bristol Aircraft, Ltd. He will be responsible for development of the Bristol *Britannia* turbo-prop airliner.

TENTATIVELY TITLED "Flight Line Chief," a new Warner Bros. picture will feature the B-52. The film is the first assignment of Beirne Lay, Jr. as a producer-writer for the studio.

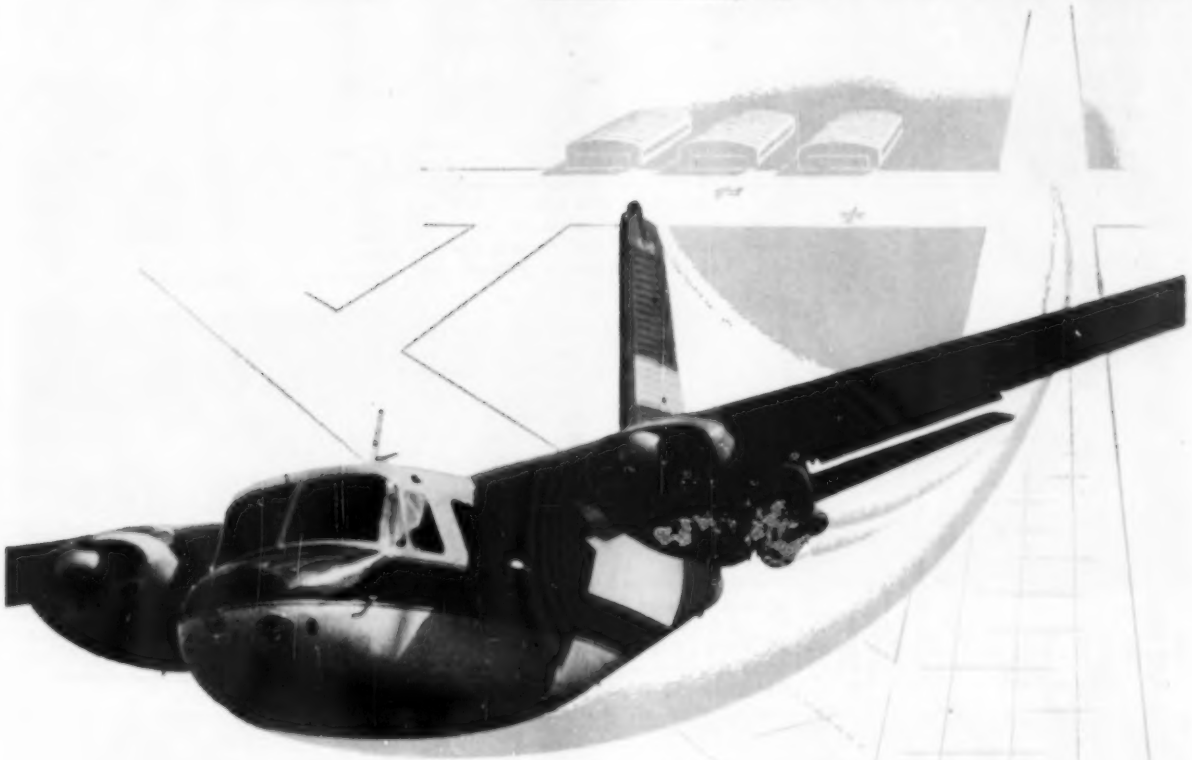
MOONEY'S FOUR-PLACE model, the Mark 20, was issued CAA Type Certificate in August. Hal F. Rachal, president and chairman of the board, received the

certificate from Calvin L. Johnston, chief of the Aircraft Engineering Division of CAA Region 2, Fort Worth. The Mark 20 is Mooney's bid for the booming four-place business aircraft market.

FLYING A CESSNA 180, Dr. and Mrs. Herman Heise of Milwaukee, Wisc., won the 3rd Annual Transcontinental Air Cruise sponsored by the Junior Chamber

(Continued on page 14)

now *Supercharged* performance



MORE SPEED—230 m.p.h. @ 70% power (260 m.p.h. maximum). **MORE RANGE**—1400 miles normal range (1600 miles maximum). **MORE LOAD**—7,000 lbs. gross (2750 lbs. usable). These are but three of the outstanding features in the new supercharged

AERO Commander 0-680-Super

For complete information see your nearest Aero Commander distributor or write for Catalog 127-S

AERO DESIGN & ENGINEERING CO • TULAKES AIRPORT • P.O. BOX 118 • BETHANY, OKLAHOMA

FLY ANYWHERE YOU WISH . . .

WITH AMPHIBIOUS FLOATS

Thousands of airports, *millions* of water landing areas are yours with new Edo amphibious floats perfected after 20 years development. Model 269's with smooth handling quadricycle landing gear are installable on any Cessna 180, give you unmatched utility. Edo Model 4580's, modified by de Havilland (Canada), give the Beaver (L-20) similar flexibility.

Standard Edo seaplane floats also readily installed on Piper Tri-Pacer, Super Cub, Cessna 170, and many other types. *This year fly floats!* See your dealer or write for Edo float brochure.

EDO CORPORATION • COLLEGE POINT, L.I., N.Y. FINE FLOATS SINCE 1925

Briefings . . .

(Continued from page 12)

of Commerce of Philadelphia. Their elapsed time was 15.65 hours and rated percentage was 152.9. Winner of the cruise is determined on a percentage basis taking into consideration elapsed flying time, safety and gas consumption.

AVIATION FINANCIAL SERVICES, INC., has been formed to specialize in financing aircraft needs of airlines and other companies that employ aircraft for general corporate use. The new company is headed by Harold R. Harris, former president of Northwest Airlines and closely identified with commercial aviation for the past 30 years.

JANITROL'S 58 page catalog of business aircraft heating equipment describes all models and accessories in detail, giving installation and engineering data and drawings. Write Dept. 200, Janitrol Divisions, Surface Combustion Corp., 400 Dublin Ave., Columbus 16, O.

BEECH AIRCRAFT has won a competition for a new type of pilotless, remote-controlled, target plane. The new all-metal target drone has been selected by the Navy for future use by weapons-training units of the Navy and will be designated the XKDB-1.

SAN MATEO, CALIF., and Flint, Mich., will be the start and finish points, respectively, of the 10th Annual All-Woman Transcontinental Air Race to be held in July 1956. Bid for the finish of the race was submitted by the Michigan Chapter of the Ninety-Nines, and was financed by the City of Flint and the AC Spark Plug Co

A COURSE IN AVIATION MEDICINE is being given this fall at the University of California Extension. Open to graduates of approved medical schools, the course is designed for the doctor who examines the student and private pilot as well as for the doctor who is a flight surgeon.

THE STATE OF KENTUCKY'S Department Aeronautics has purchased two Wilcox TVOR units to be installed at Capital City Airport, Frankfort, and at Owensboro-Davies County Airport. Cost of the latter installation is being shared by the local airport commission.

FLYING TOURISTS intending to visit Canada should write to the Department of Northern Affairs and National Resources at Ottawa for its new booklet outlining the regulations on admission of aircraft to Canada.

THE SPEED CONTROL SYSTEM manufactured by Safe Flight Instrument Corp., has been approved as optional factory installed equipment on the Aero *Commander*. The system enables a pilot to achieve the best speed for take-off, landing and low speed operations.

CIVILIAN AIRCRAFT and helicopter pilots are still needed at the Army Aviation School to be employed as instructors. Applicants should write direct to the Board of U. S. Civil Service Examiners, the Army Aviation Center, Camp Rucker, Ala., for further information.

GRANDFATHER-FATHER-SON form a team at Lockheed's Burbank, Calif., plant. Fred Heinrichs, right, is a 74-years-young expediter. His son Arthur, left, is a utilities orders and records group supervisor. Jimmy, center, Art's son and Fred's grandson, is a processing inspector.

STEWART-WARNER CORP. has purchased the John W. Hobbs Corp., makers of the Hobbs Hour Meter and Pressure Switch. J. W. Hobbs will remain as president of the company bearing his name and no changes are expected to be made in the present organization, which will become a division of Stewart-Warner.

A GROUND ANCHOR that can be driven into any type of soil, whether frozen or soft, and will provide holding power of

6,000 to 10,000 pounds, is being marketed by Laconia Malleable Iron Co., Laconia, New Hampshire. Price for 4 inch anchor with aircraft cable assembly is $3.00, plus $2.50 for a driving rod.

A KANSAS CITY publishers' representative was the first buyer of a production model Camair 480, twin-engine executive aircraft manufactured around the basic *Navion* airframe. The buyer, Fred J. McCabe of the Grolier Society, publishers of encyclopedias, flew his new 480 from Galveston to Kansas City at an average speed of 210 mph.

Thanks to the **NEW** **LORAL** ***AUTOMATIC*** **SHORT-RANGE**

GROUND POSITION INDICATOR

ACCURATE!
INSTANTANEOUS!

Developed Specifically for LIGHT AIRCRAFT and HELICOPTERS.

A new dead reckoning navigational computer — AUTOMATICALLY indicating ground position — derived from airspeed, heading and wind.
TOTAL SYSTEM WEIGHT — 18 LBS.

LORAL—*Serving in AVIONICS*

- AIRBORNE NAVIGATIONAL EQUIPMENT
- COMMUNICATION SYSTEMS
- RADAR EQUIPMENT
- TEST EQUIPMENT

Dept. F-11

LORAL ELECTRONICS CORPORATION

794 EAST 140th STREET • NEW YORK 54, N. Y.

THE NEW *Champion*

a light plane built to do HEAVY WORK

$3,795.00 FAF

Pipe Line Patrol
Aerial Crop Control
Ranching
Farming
Sportsmen
Geological
Commercial
Hobby
Industrial

CHAMPION LEADS THE WAY in producing the finest utility aircraft in the low price field . . . maneuvers at low speeds . . . lands in small spaces . . . high visibility with wrap-around windshield . . . carries an economical load . . . cruises at 105 mph.

Famous tri-cushion landing gear increases allowable loads—handles easier in high winds.

The improved Champion is a single engine, 90 h.p. utility airplane—two passenger, tandem type with high lift wings . . . optional radio, skis, floats, hydraulic brakes, self-starter . . . photographic, spraying, dusting and fogging assemblies . . . and many other items of utility and luxury.

Test fly the Champion at one of the distributors listed below. Prompt delivery.

ANNOUNCING These Distributors of Champion Planes, AERONCA and CHIEF Parts:

Aero Mech, Inc.
P. O. Box 132
Clarksburg, W. Va.

Aircraft Distributors, Inc.
31st Street Airport
7000 E. New 40-Highway
Kansas City 29, Mo.

Ardmore Air Service
Ardmore, Oklahoma

Aviation Center
Hangar No. 6
Lunken Airport
Cincinnati 26, Ohio

Aviquipo, Inc.
25 Beaver Street
New York 4, N. Y.

Blue Star Aviation
Tamiami Airport
Miami, Florida

Brandt Aero Service
119 Administration Bldg.
Holman Field
St. Paul 1, Minnesota

Calumet Aviation Co.
Gary Municipal Airport
Gary, Indiana

W. H. Coffin Air Service
Whiteman Air Park
12930 Pierce Street
Pacoima, California

Cramer-White Aviation, Inc.
Bruce Campbell Field
Madison, Mississippi

Dakota Aviation Co.
P. O. Box 118
Huron, So. Dakota

Dickerhoof Flying Serv.
Municipal Airport
Chanute, Kansas

Flightways, Inc.
Municipal Airport
Atlanta, Georgia

Kentucky Flying Service, Inc.
Bowman Field
Building T-30
Louisville 5, Kentucky

Leavens Brothers Ltd.
Fairbank Post Office
Toronto 10, Canada

Mercury Flying Service, Inc.
2417 E. Buchanan Street
Sky Harbor Airport
Phoenix, Arizona

Morrison Flying Serv.
Helena Montana

Portland Flying Serv.
Port of Maine Airport
South Portland, Maine

Sacramento Sky Ranch
Route 1, Box 3305
Sacramento, Calif.

Shannon School of Aeronautics
P. O. Box 354
Fredricksburg, Va.

Skylark Flying Serv.
Detroit City Airport
Detroit, Michigan

Skyline Flying School
100 W. Danieldale St.
Dallas, Texas

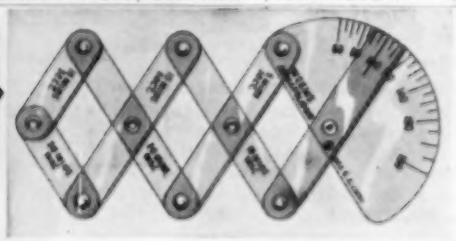
Washington Aircraft & Transport Corp.
Boeing Field
Seattle 8, Washington

Champion **AIRCRAFT CORPORATION**

OFFICES AND PLANT, HOLMAN FIELD, ST. PAUL 1, MINNESOTA

AT LAST ...a simple computer

Brought to you by WEEMS



The new Casey-Myers speed-time Computer is designed for pilotage by light plane pilots under contact flight conditions. Based on "lazy-tong" principle, this computer is the simplest to use that we're ever seen. A series of arms in lattice formation (see illus.) are connected by central eyelet pivots permitting computer to be expanded or contracted in a straight line. Distance between adjacent eyelets represents 10 minutes on WAC charts and 5 minutes on sectional charts indicating distance flown at the ground speed indicated on speed scale. This Computer makes it easy to establish ground speed and ETA while flying. Also enables you to quickly, easily find ETA at any check point for estimated ground speed before takeoff. Designed by The Honorable Richard G. Casey, Minister for External Affairs, Commonwealth of Australia. Only $4.00. See your aviation dealer or order direct from us. Address Dept. 15.

WEEMS SYSTEM OF NAVIGATION
227 Prince George Street • Annapolis, Md.

FLYING CALENDAR

Oct. 29—First annual meeting of the Midwest Flying Commuters Club for an exchange of problems and solutions at a social hour and dinner. Contact O. W. Griner at Philip Billard Municipal Airport, Topeka, Kansas.

Oct. 30—Second Annual Topeka Aviation Day featuring fly-in breakfast, church services on the airport, exhibits, etc., at Philip Ballard Municipal Airport, Topeka, Kansas.

Nov. 4-6—Ninth Annual Convention, Texas State Aviation Association, Plaza Hotel, San Antonio, Tex.

Nov. 14-16—Twenty-sixth Meeting Aviation Distributors and Manufacturers Ass'n., El Mirador Hotel, Palm Springs, Calif.

Dec. 6-7—Professional Race Pilots' Association Annual Convention and Business Meeting, Carter Hotel, Cleveland, Ohio.

Dec. 23—Eighth Annual Arizona Aviation Conference and Flight Clinic at Tucson, Ariz., sponsored jointly by the Aviation Committee of Tucson Ch. of Comm., the Tucson Airport Authority with the cooperation of Aviation Safety District office of CAA.

May 4-6, 1956—Eighth Annual Convention and Air Meet of National Inter-Collegiate Flying Ass'n., under the auspices of "Air Knockers" Flying Club, Univ. of Okla. All events and activities will be held at the University's Airport, Max Westheimer Field, Norman, Okla.

May 25-26, 1956—Third Annual Tucson-Hayward Air Race sponsored by 20-30 Clubs of Tucson and Hayward. All aircraft are due in the Old Pueblo on or before May 25.

July 7-10, 1956—Tenth Annual All-Woman Transcontinental Air Race from San Mateo, Calif., to Flint, Mich., sponsored by the Ninety-Nines, Inc. Contact Mrs. Betty M. Loufek, Director, Public Relations, AWTAR, Inc., 5316 Carita St., Long B...

Calendar items must be received at FLYING's editorial offices, 366 Madison Ave., New York 17, N. Y., three months prior to the event.

ADD TO ALPHABET

The Aviation Alphabet on Page 68 of the September issue should have included the ADMA . . . Aviation Distributors and Manufacturers Association.

Top drawer developments

achieved through Convair's ENGINEERING to the Nth POWER

Around these *top-drawer* developments at Convair, the men who plan the defense of our nation are building entirely new concepts of military strategy. Only Convair has designed and produced all basic types of aircraft – fighter, interceptor, transport, bomber, and water-based. And now, Convair has attained leadership in producing guided missiles that meet the most exacting military requirements. For our national defense... for your security, look to *Engineering to the Nth Power.*

CONVAIR A DIVISION OF GENERAL DYNAMICS CORPORATION

FLYING
VOLUME 57, NO. 5
NOVEMBER, 1955

AN EDITORIAL

ARMISTICE

ON THE blustering morning of November 11, thirty-seven years ago, I sat impatiently in a soggy cockpit waiting for other ships of the formation to taxi out through the mud of a French airdrome. We were launching our second strike of the morning.

I was Operations Officer and had plenty of chores on my mind . . . Let's get this fighting business done so a man could get back to his knitting.

But yonder on the line a commotion had developed. What in heaven's name had gone wrong now? A figure detached itself from the group around the operations tent and came dashing toward the starting line. He leaped on the side of the ship, screamed, "Armistice!" and tore back toward the hangars.

I can't remember my first flight in an airplane, or my first solo, or my first combat mission; but I remember that scream of "Armistice!" as though it was uttered yesterday.

If the sergeant had screamed "Peace!" I would have laughed in his face or cursed, as the mood chanced. Armistice I recognized as an apt summing up of the permanent status of human society. I knew there would never be peace and that there never had been peace, for I had seen the naked soul of civilization. In the Vosges, on the Oise, along the Aisne, at Verdun and Soissons and Montdidier, and in the chalk white vineyards of Rheims, I had seen, not the struggle between French and German and English, but between good will and avarice, between good and evil.

I had talked to men of many races and creeds and colors all over the battlefields of Europe. I had heard their ambitions and prejudices and loves and hates. I had played with enough bastard children along the surging map to fill a dozen orphanages. I knew that peace was not a thing of bread and wine, although the wise ones spoke of "economic stability". I knew that there was no such thing as peace except between God and man—all the rest was armistice and armistice alone.

So I taxied back to the hangar line. I didn't feel exaltation or remorse. I didn't feel anything except a great pity for millions of people who thought they had purchased peace and that the world was now safe for what they called democracy. I knew the world would never be safe for any great ideal unless people of good will were strong enough to hold avaricious men in check. And there would always be avaricious men.

Now a simple man and a mere citizen must apply himself to the problems of life in ways which are open to him and in the place where he stands. The airplane in those days was not much but it was the only potential available to handfuls of young fellows who had had eye opening experience with the realities of human nature. If it could be developed to play a great role over the years, it might serve a double purpose in a constructive direction. First, it might be an effective way to hold avarice in check. Second, it might be a method to overcome traditional suspicions by providing better contacts between strange peoples.

We didn't know much about aviation but we knew more than anyone else. I have a great sympathy with the people who laughed at our antics and were skeptical of results. We sure talked fast and flew slow. And probably neither performance made much sense. But finally we got somewhere, not because we were wise or skillful, but because the airplane has the greatest potential since the invention of the wheel.

World War II was the turning back of avarice by air power and the airplane has so far kept the integrity of armistice for a civilization in spiritual conflict. Air power is even declared the instrument of national policy.

Should this be cause for gratification to an old airman? I wish it were all as simple as that. But no, because men of good will again are taking an erroneous reading on the status of human nature—are talking of "peace" and forgetting the periodic demonstrations of how volatile and vulnerable is civilization at its best. The input of airpower is insufferable and the proposed cutback of air power is intolerable to anyone who knows that the word is not peace but armistice.

Gill Robb Wilson

Gill Robb Wilson
Editor and Publisher

AMERICAN EXTENDS FAMILY ½ FARE PLAN TO THURSDAYS!

Beginning October 10th,* you can save from 12:01 Monday noon to 12:01 Thursday noon

American is extending its famous Family ½ Fare Plan to Thursday mornings to give families a wider choice of fare-saving days.

Up to now it was only on Mondays, Tuesdays and Wednesdays that any person who purchased a full fare ticket could take along his or her spouse and their children for half fare. But beginning October 10th,* American's Family ½ Fares will be in effect from 12:01 Monday noon to 12:01 Thursday noon.

In 1948 American Airlines first introduced the Family ½ Fare Plan. Since then thousands of families have saved hundreds of dollars by using it. Next time you plan a family trip, remember that American offers the widest choice of days on which you can enjoy Family ½ Fare savings.

**subject to CAB approval*

AMERICAN AIRLINES

America's Leading Airline

Who but an experienced airman can be fully conscious of air mobility and of the application of this mobility to geography?

By LORD MALCOLM DOUGLAS-HAMILTON, O.B.E., D.F.C.
Group Captain, Royal Air Force

THE WORLD MUST LISTEN

EDITOR'S NOTE: Group Captain Hamilton, graduate of Eton College and the R.A.F. College at Cranwell, is not only one of the world's most distinguished airmen but an economist and administrator as well. Serving five years in the British Parliament, he also brilliantly launched the movement to rehabilitate the economy of northern Scotland.

Former light heavyweight champion of the R.A.F., pilot Hamilton compiled 5,400 hours of military flying in China, South Africa, India, the Near East and Europe. His log book shows 110 types of aircraft flown. He is a specialist in long range reconnaissance and led the Squadron which first photographed Peenemunde and pinpointed the V-1 bases of World War II.

Born Nov. 12, 1909, at Dungavel, Strathaven, Scotland, Lord Hamilton is the third son of the 13th Duke of Hamilton, premier Peer of Scotland, and brother of the present Duke. In 1953, he filed his first papers for American citizenship.

THE FUTURE OF THE majority of mankind hangs on the answer to a single question: How shall we choose to use the air, this "ocean that laps on every man's doorstep"?

Time, since Orville Wright's historic flight, is hardly a second on the great clock of human history. In this brief interval, air progress has been phenomenal. Yet we can not expect the great majority to have adjusted themselves, either mentally or emotionally, to its implications. The conquest of the air is something utterly new.

We who have had flying experience, and particularly in combat, are in position to dread air war potential more than most others. We know how hard and how fast a great air force can strike, and recoil from the thought of millions vaporized without warning.

Yet, all too few are today appraising air power in proper context. All too few realize how conquest of the air has ushered into our world a totally new situation. Not all the implications of this new situation are bad. Some, if comprehended, may yet bring mankind untold blessings. But all its implications must be thoroughly understood, and our old concepts realigned with them, if we and our kind are to survive.

Air power has made war universal in its application. If war comes, none can expect to live as civilians in the traditional sense. We need not "go to war." War will come to us. Wherever we may be—at work, at play, at

business, in school, or in church—we cannot expect to escape it. The very thought has made war universally unpopular.

It is, however, no new concept that peace is preferable to war. Among those involved in it, war has never been popular, but today it is virtually impossible for anyone to choose not to be a participant.

The basic motives which move men by nature have not greatly changed during recorded history. On one hand is the desire for naked power with which to control others. On the other is the equally strong desire to preserve freedom. Inevitably conflict results. And now the nature of weapons gives to our human quarrels the potential of universal and total destruction.

Slowly and painfully, man has climbed up from the caves, from a life "nasty, brutish and short" aspiring to a fuller life, both for his body and his spirit. These two aspirations have gone hand in hand, creating a whole treasury of values that can be called only "human."

Not all men today enjoy equally a high standard of living. We of the West have sincerely striven to share our material comforts with those who have never had them. Paradoxically, our very good will has sometimes created envy rather than understanding and appreciation. Those who resent what we have, fail to realize that we gained it through creation of a free society. Our free society alone gave us opportunity to create material abundance and the principles by which we live—the sense of justice and fair play, the freedom to make the best of

TO AIRMEN

ourselves and our opportunities. We could lose the material things and build them again in the context of freedom. But if we lost freedom, the standard of living we cherish soon would be lost irrevocably as well.

That we have liberty and its consequent material blessings today is due entirely and simply to the fact that our forbears were once ready to fight and die for them. Whether we can hold them in the future depends equally now upon whether we in turn are ready to fight and if need be to die, in their defense.

Kipling caught the mood of the first world war when he wrote:

Our world has passed away, in wantonness o'erthrown,
There's nothing left today, but steel and fire and stone . . .
Comfort, content, delight, the ages slow-bought gain,
They vanished in a night, only ourselves remain
To face the naked years, in silent fortitude,
Through perils and dismays renewed and re-renewed
Tho' all we know depart, the old commandments stand,
In courage keep your heart, in strength lift up your hand.

Although I was too young to appreciate Kipling in World War I, I still recall the impact of these words upon me when I read them at an air station during World War II, and realized their profound and simple truth. "The ages slow-bought gain" is ours today, only because men and women down the years have been prepared to fight and die for it.

It is my deep conviction that we cannot, as free men, lift up our hands in strength without giving weight, in this air age, to those who understand the air ocean, who know what can be done and what cannot be done in it. We hope with all our heart that the "next war" will not come and as sane men we shall do all we honorably can to avert it. Nevertheless, it would be folly for us not to prepare against it. And, in this preparation which is both material and psychological, we must make certain that it is the *next* war we are planning to fight if we must—not the *last* war.

Human thinking is such, and history has evidenced it over and over again, that those in charge of strictly military establishments tend always to think of the "next war" as being fought with the weapons of "the last war." If this is natural, because men tend to rely heavily upon their own experience, it is also exceedingly dangerous. Many a nation has suffered defeat because of this perilous conservatism often associated with the military mind.

It is only realistic to recognize that much of the thinking of the armed forces of the Western world has been conditioned by naval or army tradition.

Britain, for example, has depended so much so long on sea power that one of her greatest obstacles in grasping the implications of air power is the forceful naval mind. British admirals are formidable men, and ingrained in seamen of all nations is the feeling that the sea is really All. Even Winston Churchill, great strategist that he is, was slow in realizing the importance of air power in 1940. He thought the German Navy, in the invasion of Norway, had committed a great tactical error. The Royal Navy, acting with its usual skill and bravery, gave the Germans a bad mauling, but the fact remains that because of air power, British ships were in effect bombed out of Scandinavian waters.

The Germans, on the other hand, were as army-ridden in their thinking as the British were navy-ridden. Fortunately for us, the Germans never, in World War II, really comprehended the potential of strategic air power. The Luftwaffe was employed chiefly as an auxiliary to actual or projected army operations. In this particular instance, the two handicaps cancelled each other out in the result: the great productive capacity of the allies, particularly the United States, no less than the strategic blunders of Hitler, enabled the allies to build up the air strength that became decisive.

Allied air superiority was not, in itself, sufficient to win that war. Hard fighting on land and sea was essential to victory as well. The lesson we must learn and never forget is that in the next war we must achieve and maintain not merely *superiority* in the air—we must get and keep air *supremacy*. With less than supremacy, we may not survive.

This is not to say that land and sea forces are no longer important. Both are still of immense importance. Nothing could be more damaging to popular understanding of the role of air power today than the thesis sometimes argued by airmen with little over-all strategic experience, that the air arm is the only thing that matters. Integrated military, naval and aerial strength is essential to the fighting of the next war if it comes, with full recognition that the paramount consideration in any modern defense system is the air, and that air power must never be shackled by making it subordinate to purely naval or military thinking.

In the United States there have been fewer obstacles to the development of air-mindedness than in Europe, though they have existed and are not even yet entirely eliminated. The formation of United States Air Force marked a great step forward, and the creation of the Air University and, just recently, (*Continued on page* 49)

Brig. Gen. Clarence A. Shoop, Commanding Officer of the 146th Fighter Bomber Wing, Air National Guard.

MEN OF THE 115th Fighter-Interceptor Squadron based at Van Nuys, Calif., wear gaudy, green French tams with the red letters, "HFOTSOT" (literally translated) "Hottest Fighting Outfit This Side of Tia Juana." Actually, the 115th and its three sister squadrons, which make up the 146th Wing of the far west Air National Guard, aggregate one of the hottest fighter outfits this side of anywhere. Built around a hard core of aces full of battle savvy, the 146th mans F-86 *Sabrejets;* has morale second to no regular or reserve outfit; and is skippered by a commander who can fly the crates they came in. Brig. Gen. Clarence A. Shoop is a general officer in the California tradition—glamour in his handsome mug and hard-headed sense under his jet helmet. As boss man of the 146th, General Shoop, unlike the ordinary brass hat, is a *flying* general. Not many pilots in the United States can match his experience as a test and combat pilot.

Just as much in love with flying as is their "honcho," the pilots of the 146th boast a wealth of experience that would be the envy of any regular Air Force Wing Commander—and yet it must be remembered that the 146th "Minutemen" are for the most part "Sunday soldiers". During the work-a-day week they are employed as everything from auto salesmen to movie extras. It is only after they have made their living that they shuck off the smog and flee to the freedom of "40 angels"—fighter-pilot jargon for 40,000 feet.

The 146th Wing, outgrowth of the old 115th Observation Squadron, played a major part in the second World War, flying in Sicily, the Rome-Arno theatre, the Po Valley, the North Apennines, and the Naples-Foggia area. During the Korean campaign, the Wing was mobilized under

The Sunday Skymen of California's Air Guard form a tough fighter outfit of good planes, battle-tested aces and a hard-flying boss man.

SHOOPIE'S SABRE SWINGERS

By ED MACK MILLER

An F-86 *Sabrejet* of the 146th "going over" above Los Angeles.

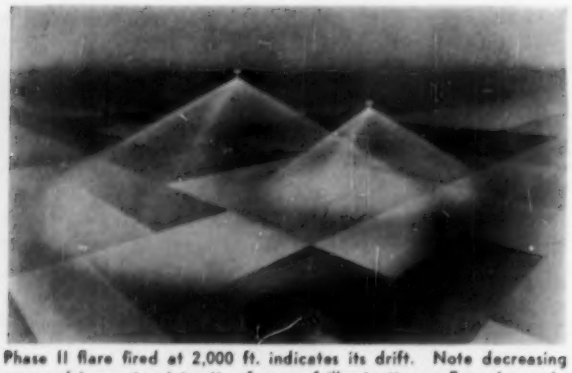
both major commands, SAC and TAC. Many pilots entered the Korean conflict as replacements and several were killed in that conflict. Wing headquarters is now located at San Fernando Valley Airport in Van Nuys. In addition to the support units and two tactical squadrons based there—the 115th and the 195th Fighter-Interceptor Squadrons—a wing tactical squadron is based at Ontario, Calif. (the 196th Fighter-Interceptor Squadron) and another is located at Phoenix, Ariz. (the 197th Fighter-Interceptor Squadron).

In the Air National Guard "world-wide" gunnery competitions of '52 and '53 General Shoop's wing placed second, and his unit has never placed lower than fifth in the annual all-guard meet.

His wing was one of the first in the nation to be called by the regulars for "runway alert" duty, when Air Force planes were grounded for various reasons. For performing this function the 146th has received commendations.

A "really hot" unit, the 146th is seldom out of the news. Recently the country was thrilled when one of Shoop's pilots, 1st Lt. John Conroy, flew his F-86A, "The California Boomerang," transcontinentally both ways in one day, having breakfast in Los Angeles, lunch in New York City, and his evening meal back in Los Angeles. Conroy, having logged more than 11,000 hours, flew B-17's in World War II, was wounded and shot down on his 19th mission, spending six months as a P.O.W. Now in the swimming-pool contracting business, Conroy, once a motion picture actor, had been thinking of the flight for two years and actively planning it for three months.

Somewhat "beat" after his double coast flight but still wearing a cocky grin, Conroy tied into a steak after alighting and went to the Air Guard dance that night with his pretty wife, Jeane. The (*Continued on page* 54)



Phase II flare fired at 2,000 ft. indicates its drift. Note decreasing *area* and increasing *intensity* of cone of illumination as flare descends.

Phase III flare fired at 1,200 ft. Note drift and extremely small area of cone of illumination, especially at lower altitude in final stage.

Below: Flight pattern overlay on Phase II flare. Field selection is done best below flare level but plane must stay within cone of illumination.

Below: Phase III, approach and landing. Plane is making 360° overhead approach as flare drifts downwind. A 180° could also be used.

WHEN YOUR ENGINE QUITS

The findings of the parachute flare project at the University of Illinois.

IT'S DARK OUTSIDE. You're on a night flight en route from a business meeting to your home field. Your light airplane is adequately equipped with instruments and radio gear. A glance at the panel shows all needles in position. This is strictly a routine night flight. You've got it made.

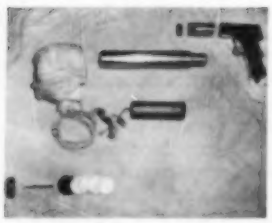
Everything is so rosy that you don't notice the slight offbeat of the engine . . . not for a while at least. There! Now you hear it! Your pulse quickens slightly. You turn up the red cockpit lights. There it is again! The tach indicates a definite fluctuation in rpm. Check the carburetor heat; a slight drop in rpm with no following build indicates no ice. The fuel gauges show plenty of gas, and the tank selector valve's okay. The tach still dances slightly and the engine is beginning to sound strangely unfamiliar—no longer a friend. Your insides are beginning to churn now. How about a lighted field? A glance at the map shows the closest one back at Terre Haute, over 20 miles away. This may be serious! Better park this thing. . . . Gosh, it's dark out there. . . . No moon tonight. The engine is definitely rougher now, and the oil pressure is starting to slide in the wrong direction. . . . This is it! Let's get on the ground before it quits altogether. . . . Too late, she's gone!

Panic seizes you. . . . Think! Think, man! If you don't do something fast, you've had it! A flare! Where's the kit? It must be in the back somewhere. . . . There it is under your coat. Grab it and get a flare over the side.

Then what? . . . They didn't tell you that. . . .!

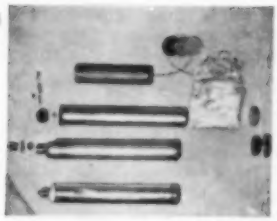
That was a sad tale, wasn't it? And, whether you like it or not, it could happen to you. The answer for the chap in the story might well be the salvation for all of us who wish to realize maximum utility from our light airplanes. It points to the need for a definite technique in the use of flares under night forced-landing conditions. Whatever the pilot's experience level, he usually expects, and attempts, to realize maximum utility from his airplane proportionate to his own abilities. The high price tag on today's lightplane make this an absolute necessity.

If you expect a reasonable amount of transportation from your plane, you've probably made an occasional night cross-country flight, or at least you've given it some consideration. Whether you decided pro or con, your decision was probably based on the possibility of an

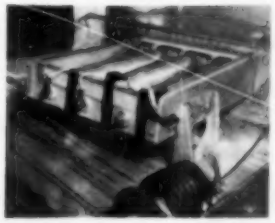


1

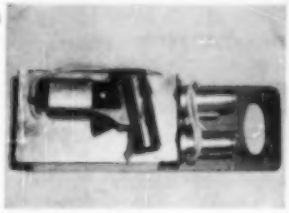
2



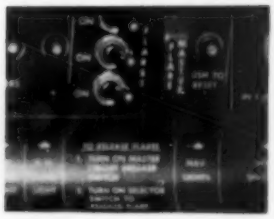
3



4



5



6

1
Components of the Class 3, one-minute, pistol flare.

2
Deterioration of black powder expellant charge due to age (5 years) caused this flare to plummet directly to earth.

3
Components of the Class 3, one-and-one-half-minute flare.

4
Interior view of three rack-mounted one-and-one-half-minute electrical flares located aft the baggage compartment in a *Bonanza*.

5
Portable flare and pistol used in Cessna 140 and 170, *Tri-Pacer* and Stinson 150.

6
Flare switching arrangement in circuit breaker panel of a *Bonanza*.

AT MIDNIGHT

By JESSE W. STONECIPHER
MILLER R. GREEN, RICHARD E. MANKUS

engine failure and the attendant forced landing in the dark. Admittedly this is a big decision to make and it will be tempered by the pilot's confidence in his machine as well as in his own navigational ability. There would be no problem if the pilot could select a field and land as safely at night as he can during daylight—not a very profound statement, but still quite true. Most pilots know that a solution to this problem is available. The parachute-supported illuminating flare will provide the source of light necessary for the short period involved in executing a forced landing. Only the technique for the proper use of such flares is lacking.

It was to develop this technique that a number of pilots who do extensive night cross-country flying at the University of Illinois undertook a formal study of the parachute flare. The study was made with the cooperation of the International Flare-Signal Division, Kilgore, Inc. of Westerville, Ohio. They provided 40 parachute flares and gave us carte blanche for development of a standard set of procedures tailor-made for light airplanes. The conclusions reached indicate flares can be used to a distinct advantage in this situation, provided the pilot has made a study of flare performance; and has practiced coordinating its performance with that of his airplane.

There are two types of available flares which lend themselves to the peculiar problems of the lightplane pilot. One of these is the one-minute, pistol-fired flare, and the other is the one-and-one-half-minute, electrically-fired flare. Local prices vary somewhat but the 37 mm pistol costs approximately $42 and one-minute flares $21 each. A complete rack of 3 one-and-one-half-minute, electrical flares, including switches, runs to $130. These prices are not high in terms of their value to the pilot in a night forced landing situation.

The rack type flare should be mounted only by an aircraft mechanic faithfully following instructions provided by the manufacturer. Correct installation is important, and the flare tubes must not be dented or damaged in any way. The surrounding airplane structure must be capable of withstanding a momentary thrust of 150 lbs., and sometimes a "beefing" up of the supporting portion is necessary.

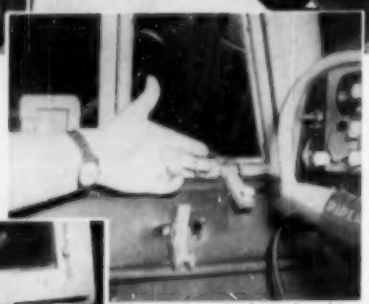
The pistol kit offers the advantage of lower cost as well as portability. Although it requires little stowage space, it is sometimes difficult to place it in a position where it will be readily available in time of need. If your airplane is suitable, the rack type electrical flare is definitely recommended; there is no stowage problem and firing with toggle switches is a simple operation compared to loading, aiming, firing and reloading the pistol.

Firing the pistol flare is quite an experience. Our pilots described it variously as anything from the equivalent of a 12-gauge shotgun to an elephant gun. Actually the shoulder will adequately absorb all recoil if the arm is kept straight at both the wrist and the elbow when firing. Accompanying photographs illustrate the line and method of fire used. Potential "hangfires" can be easily dropped clear using the quick release on the side of the pistol. However, we found removing a spent cartridge sometimes required two hands.

Both flares must meet certain minimum specifications laid down by the CAA in TSO-C24. We've attempted to simplify flare information, both specifications and recommendations, by tabulating this data in Table 1. Check it carefully, it contains the minimum technical information you should have regarding flares.

Table No. 2 contains our recommendations for using the two types of flares in specific airplanes. Since the flare illumination is cone-shaped, all recommended altitudes are compromises between *area* and *intensity* of ground illumination. The higher the flare is fired, the greater the area illuminated but the lower the intensity at any given point. Conversely, the lower the altitude, the greater the intensity but the smaller the area of illumination. This feature, tempered with consideration for the airplane's rate of descent, was a prime factor in selecting recommended altitudes for firing. The high altitude flare may not give the detail you would like but

Below: Line of fire from *Tri-Pacer* with modified window open. Note the straight wrist, elbow, and left-handed fire of the pilot.



Above: Detail of window hinge pin modification in *Tri-Pacer*. The window can be operated normally when this pin is in place. Left: Hinge pin removed, allowing window to open completely. This modification could be used in other types of planes.

Right: Line of fire from Cessna 140 with no window modification. Note straight wrist and elbow. Left-hand fire lets shoulder absorb recoil.

Left: Pilot of *Bonanza* fired this flare at 1,200 ft. and was completely unaware that it had not expelled properly until he had landed. Chute was in this approximate position during flight.

it will allow you to select a suitable field for a safe landing.

In selecting an altitude for firing the second flare, we found the problem reversed, because, although we had ample intensity, the area of illumination was so small that exact positioning of the flare became difficult. The uncontrollable factor here is drift after the flare is fired. It was for this reason that we standardized our pattern on the 180 or the 360-degree overhead approach. We also timed flare firing altitude-wise to allow a margin for error in judging wind drift. You must constantly keep in mind the fact that the area of illumination will move downwind and thus favor this direction with your attention, both in selecting a field and in making your approach to it.

Now let's take the unhappy chap in the opening paragraphs and give him a second chance. Let's be specific and base our flight on a C-35 *Bonanza*, equipped with 1½-minute electrical flares. We're on a night cross-country over relatively unfamiliar terrain cruising at 4,000 feet above ground. We've already experienced those uneasy moments during which we became conscious of a sick engine. We've made our check of gas supply, mags, carburetor heat, tank selector valves, etc., all to no avail. The engine simply refuses to run. This is it! A forced landing at night. We'll break it down into three phases in order of occurrence:

Phase I—*General Area Survey and Preparation.*

First, let's make a mental note that we have 2,000 feet, or slightly less than three minutes, to complete Phase I. Three minutes is plenty of time, provided we go about the task in a methodical manner. Let's roll the trim tab, slowing the airplane to normal approach speed, 95 mph.

While we're adjusting trim and, incidentally, converting excess speed into altitude, we make a careful survey of the surrounding terrain. There's no point in firing a flare at this altitude; it would just be wasted. Let's see how much we can distinguish on the ground with night vision alone.

A large cluster of lights to our right indicates a town, and that narrow ribbon of lights below tells us that's a well-used highway. Off to our left there is nothing but a black void punctuated by single lights here and there. This is open country and the chances are good that's our best bet. Is it close enough? We must reach it during Phase I. At 95 mph in three minutes we can cover approximately four and one-half miles. Yes, we can make it, so let's wheel her over to the left and head for the selected general area.

While on the way let's complete a mental check-list of all tasks we can perform now to simplify the next two phases. Ignition switch to the "Battery" position reduces possibility of fire on gear-up landing, but we can't shut her completely "off" because we'll need the electrical system later. Turn gas selector to "off". If the prop stops windmilling, let's save that $300 blade by bringing it to a horizontal position with the starter. How's the time? Twenty-eight hundred actual, another minute. Airspeed indicates trim okay at 95 mph. Let's open the circuit breaker panel door and check individual flare switches for "off" position—wouldn't want them all to go simultaneously when we throw the "Master". They're all "off" so we turn the "Master" switch "On" and double-check to see that it stays in the "On" position when released—a defective circuit breaker in the switch would throw it back to the "Off" position.

How's our speed and altitude? Ninety-five, okay, and coming up on 2,300 feet actual. A glance outside reveals we're over our selected general area and we have enough altitude remaining to head the plane directly into the wind. Let's see, that was Southwest at take-off, wasn't it? While we're completing the (*Continued on page* 60)

This fixed base flight operator has found a solution to private flying's difficulties in metropolitan areas.

SMALL PLANES AND BIG CITIES

By FLOYD BEAVER

THE HEAVILY-LOADED FREIGHTER lurched hard aground in the waters north of San Francisco. Within an hour, a chunky *SeaBee* nosed alongside with salvage experts and the ship was refloated at vast saving in vessel and cargo.

A military *Constellation* went down in the Bay. The city editor of a San Francisco newspaper reached for his phone and, minutes later, a photographer leaned out the window of the same *SeaBee* to snap a picture that hit the wires hours ahead of competition.

When Middleweight Champion Carl "Bobo" Olson set up his training camp in a resort area 90 miles north of San Francisco, his manager called on the same *SeaBee*, and its light sister planes, for a ready link with the city and its news facilities.

These missions, and hundreds more over the past seven years, have made Bob Law's Commodore Air Service what a local government official has called, "The fastest growing business in the country."

Yet, in 1948, Law, then a young Air Force veteran, faced the same problems which have proved devastating to private flying operators in metropolitan areas.

The San Francisco area, as a matter of fact, is probably plagued to a greater extent than any in the country with those conditions which have been deadly to private flying. There is around the Bay area a relatively small amount of level land, and population has spurted, calling for construction of thousands of new homes, many of them on land once used as airports. One small field after another has disappeared until, today, the San Francisco private pilot must operate either out of a huge commercial field or drive 25 to 30 miles to find a private airport.

The success which Bob Law has met in building his Commodore Air Service indicates an answer which applies not only to San Francisco, but to practically every other metropolitan area in the United States. The answer is seaplane bases.

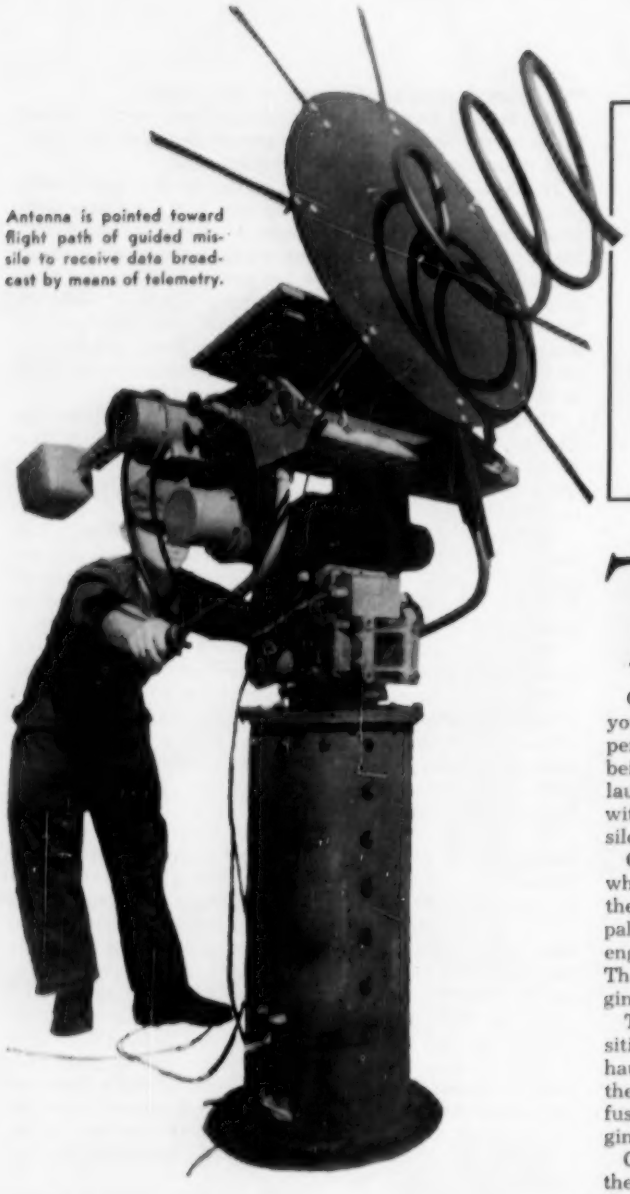
Geologists disagree on exactly how San Francisco Bay was formed, but for Bob Law, and his wife, Alice, the result is the same . . . literally thousands of square miles of flat surface! And that is a result which is reproduced by every sizable river, lake or coastal inlet in the country.

When Lt. Law, fresh out of the Air Force, landed on an arm of San Francisco Bay, his stock of equipment consisted of one Luscombe on floats and a yen to make his living in aviation. He used his savings to buy three acres of marshland, much of which appeared and disappeared with the coming and going of the tide. There was a rickety pier on the property, but not much else. There had never been another business located there.

On the plus side was a busy highway just across the fence. There were hundreds of pilots in the area and a steadily decreasing number of airports. There was the inherent safety and utility of float flying. And there was Bob's own determination and willingness to work. At any rate, seven years later, where once was nothing but mudflat and marshgrass, is now a $25,000 hangar-office-clubroom, complete with docking facilities and landscaped grounds. Plans are also in the works for additional space for a social hall and Link trainer set-up. Where the single Luscombe was tied in solitary splendor in 1948, nine *SeaBees*, a *Super Widgeon*, three Luscombes and a *Cub* rest on graded hardstands. And, where Bob waited alone for his first job, there are currently two full-time mechanics, one full-time instructor, a commercial pilot and additional instructors at peak times.

This staff is in addition to Bob's wife, Alice, a former San Francisco fashion model, (*Continued on page* 77)

Left: Bob and Alice Law, one of the most effective selling teams in the private flying business. Below: A general view of Commodore Air Service.



Antenna is pointed toward flight path of guided missile to receive data broadcast by means of telemetry.

A crash program on guided missile development and production appears indicated as essential national policy

By MARTIN CAIDIN

TO FLYING MEN, ASSIGNMENT to a missile outfit can be "Exile". It is strange, then, that missile units exhibit fierce organizational pride —a grim determination that the squadrons be hot-rock outfits. Yet no man to date has lost his life in an accident.

On one rare occasion when courage replaced science, a young lieutenant braved a fiery death to maintain the perfect operational record of his unit. A *Matador* was being prepared for take-off, mounted on its steel-frame launcher. The jet engine screamed under full power; within seconds the rocket bottle would flame and the missile would thunder skyward.

Only this time it didn't. The small restraining bolt, which holds the bird to the launcher, snapped. Pushed by the jet engine, the bird leaped upward, then fell back, impaled on the steel posts. The missile was "hung up", its engine bellowing. A ruptured tank could mean explosion. The launch officer couldn't hit the switch to kill the engine; the cables were severed.

The lieutenant ran out from behind his sandbagged position, clambered over the trailer onto the missile nose, hauling with him the severed cable end. At any moment the tanks might go up. He inched his way along the sleek fuselage, taking a severe beating from the screaming engine, until he reached the other cable connections.

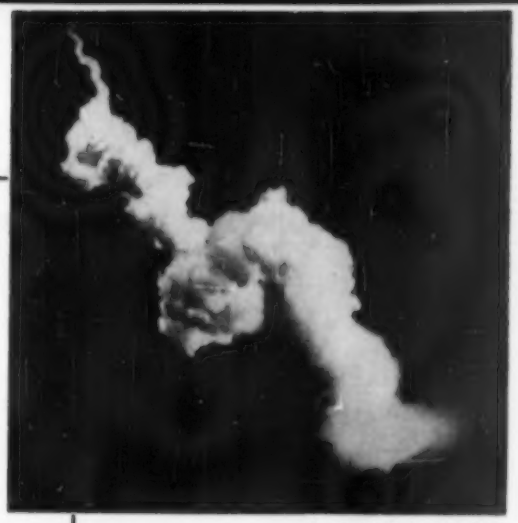
Grasping the two cables, he tried several times to bring them together to trip the engine cutoff switch. Each time an electric shock contorted his body. The watching men

AEROBEE

REGULUS

LARK

MISSILE REPORT



Contrail of *Viking* rocket.

saw the spasms. Finally he hit the right combination. The engine shriek died. An awed crew gently pried his "frozen" fingers from their hold and carried him down.

To watch missile squadrons run through combat firings is to see an amazing feat of coordination. There are no concrete blockhouses, no underground cables, no vast instrumentation. The trucks plow over scrub and sand; the men work in blazing heat, surrounded by choking dust. They stand barely a hundred feet away, crouched behind sandbags and trucks, till the booster explodes with its incredible roar. I watched a mass shoot once; no less than five birds thundered off the ground. But it was the men whom I remember.

True, this is supposed to be a missile report but I couldn't refrain from mentioning the calibre of the men before the calibre of the missiles. Now for the latter:

Two missiles, the *Shark* and *Navaho*, are intercontinental range, cruise-type, pilotless aircraft. They take off, constantly increase speed and altitude in flight, and possess accurate guidance. Their utilitarian concept, moreover, extends beyond a limited military role. Society has in this type of vehicle a potential tool for air logistics as high-priority cargo carriers. They accommodate a maximum payload, fly above weather, and their accuracy can be improved over the military role by beam-rider equipment.

These are only two among hundreds of designs incorporating innovations which raise them from experiments into accurate carriers. They are only fragments of the most incredible industry in America—robot weapons.

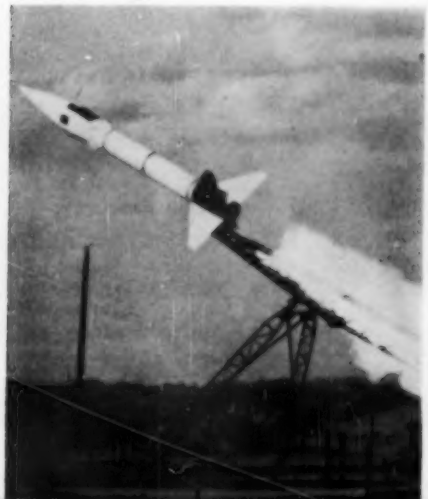
The Air Force Missile Test Center at Cape Canaveral, Fla.—a sprawling 12,000 acre installation—is the most intensive robot weapons project in the free world. Cape engineers test a bewildering variety of Air Force missiles, and also medium and long-range birds of other services. The range is unique in that it can test missiles over a course measured in thousands of miles.

Many embryonic missiles do not require this two-hundred-million-dollar facility. These lesser weapons thunder skyward daily at White Sands, Point Mogu, Eglin, Holloman, Edwards Air Force Base, and other stations. Much initial development takes place in laboratories and wind tunnels.

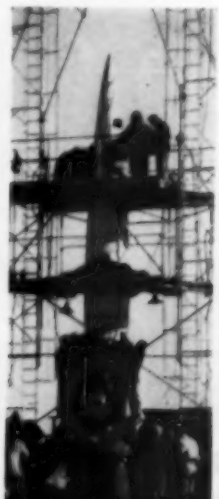
Tactical missiles are those designed to plunge anywhere from 20 to 1,000 miles from their launching sites. A missile has strategic capability when its armed range exceeds 1,000 miles.

To fill the air-defense role, there are pilotless interceptor aircraft; solid and liquid fuel rockets which ride radar beams or employ electronic brains to pursue their manned targets. Robots launched from fighter planes seek out and follow fleeing aircraft through any maneuver. Missiles hunt down submarines and pursue warships on the open seas. Warships and submarines can launch them against cities. They can be fired from subterranean or submerged launchers. There are missiles for intercontinental range reconnaissance, and decoys to draw off interceptor rockets. And one day, it is hoped, there will be

HONEST JOHN



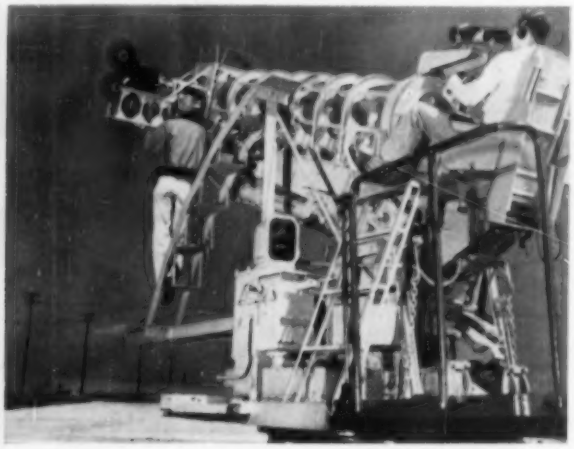
HERMES



FALCON

V-2

Below left: Capt. William D. Baxter scans board showing missile's flight. If it wanders off course or endangers installations or personnel, he can press a button to "destruct the missile." Right: Located 35 miles from launching sites, this 16-inch reflecting telescope on a 90mm AA gun mount records the entire flight of a missile with a 35mm camera.



some defense against the supersonic rocket plunging from the vacuum above the earth.

With exception of the ballistic rocket, missile development is a natural step forward from advanced aerodynamics and electronics. Almost all missile manufacture lies within the aircraft industry or its associates, although major industrial firms such as Chrysler and Firestone have entered the field. This is big business, measured in billions of dollars. North American Aviation alone has *more than 10,000* engineers working on missile guidance and propulsion.

Often a missile results from combined efforts, as with the Army's *Nike*. After basic research by Army Ordnance, the Army pooled the services of Douglas, Sperry, and Western Electric to produce the final product. Major electronic companies, such as Sperry-Farragut, Bendix, R.C.A., Philco, Raytheon, Hughes, Emerson Electric, Western Electric, General Electric, and others, have moved bodily into missile production. The major aircraft manufacturers, represented mainly by North American, Convair, Boeing, Martin, and Northrop, Douglas and Lockheed have expanded enormously their electronics facilities. All this activity has brought forth a profusion of missile types.

These advances, however, should not be construed as "satisfactory progress". There are dangerous gaps in the development program. Many engineers are bitter about what they term "puny and second-hand" budget allocations.

"Washington screams for missiles in service immediately," one engineer told me, "but how can we give them the birds they want when for years we've operated on peanuts? You can wave around a figure like three billion dollars obligated for missile development and procurement, and it looks impressive. It's not. That money includes laboratory research, wind tunnels, engines, metals, temperature studies, research vehicles, and electronics. It even includes the roads at the bases, telephone poles, lavatories, pencils and rulers, press releases . . . *everything*. The submarine cable at the Missile Test Center alone cost 25 million dollars. What about all the test programs which, because we found something better, were abandoned? A lot of the money appropriated for missiles never goes for the final product . . . something you shoot.

"For too many years the United States has permitted its missile program to lag. The penalty may be that we now place second-best to the Russians, for Soviet technical development has been uncomfortably excellent. There is no denying that we are following an essentially conservative approach to missile development, despite service demands

MATADOR

RTV-N-15

Below: At Missile Test Center, Grand Bahama Island, Askania instrument position has theodolite-timing tracker to visually track high altitude missiles.

Right: Special radar antenna tracks missile from launch as bore-sighted camera sights along radar beam to record first phase of missile flight.

that a crash program be at once instituted at any expense."

Despite great technological advances, missile evolution leaves much to be desired in reliability and accuracy. Most project engineers hedge on placing their weapon in mass production. They feel that "just around the corner" lie minor changes which can make their missile more effective. So they wait "just a little while". The delays too often have become months and years, and the missile remains an experimental machine useless to field commanders. Many of our projects have lagged seriously, with timetables again and again extended. The engineer wants to "wait" to improve his missile. The field commander, looking down the throat of formidable Russian forces, wants his weapons *now*.

The bombardment missile has been the most significant in challenging conventional weapons of the armed services—heavy bombers, artillery, and aircraft carriers. Understandably these have received the most intensive development by the military.

The first such operational missile was the Martin TM-61 *Matador*, now with the USAF's 1st and 69th Guided Missile Squadrons in Bitburg, Germany, and the 11th G.M.S. in the 9th Air Force at Orlando, Fla.

Both squadrons in Germany are self-contained; carry all necessary firing and support equipment, are fully mobile, and can launch their missiles on short notice in daylight, at night, in rain or snow. Recently the squadrons were air-lifted to Africa and launched several *Matadors* in tests from the Libyan desert.

The *Matador* launches from a mobile trailer-ramp, no larger than the big trucks you meet on the highway. A rocket bottle kicks the bird into the air with enough speed for its 7,000-lb.-thrust jet engine to sustain flight. Wherever you park the truck, you can launch.

During its cruise path to target, the TM-61 is radio-guided from a ground station, using radar intelligence for course correction. It cruises with steadily increasing speed and altitude. As fuel is consumed, the bird becomes lighter; the steady engine thrust then adds speed and height to the missile. It flies at high subsonic speed for a range of some 600 miles. Over the target at 45,000 feet, it drops into a supersonic dive on its objective.

Well into production and service use is the Army's SSM-A-17 *Corporal*. A slim 40-foot-long rocket, the *Corporal* is a true ballistic supersonic weapon. The first operational unit, the 259th Field Artillery Battalion, is now in Germany. *Corporal* rockets are carried by self-propelled transporters and launchers. The six-ton missile is raised to a simple launching site and fired from the vertical.

The *Corporal* is especially suited for targets 20-50 miles beyond range of conventional artillery. It climbs along a radar beam until the rocket motor cuts out at a predetermined point, after which the *Corporal* follows a ballistic trajectory. The system cannot be jammed by outside interference.

Also in quantity production for Army is the unguided *Honest John* rocket. A straightforward, three-ton, artillery projectile 21 feet in length, the missile is powered by

BOMARC

Four Sparrow air-to-air missiles on Douglas F-3D.

a solid-propellant rocket and stabilized by four external fins. *Honest John*, intended for mass fire barrages, is carried on self-propelled launchers.

Third in Army's offensive missile family is the still-secret *Redstone*, a giant liquid-fuel rocket developed under Dr. Wernher von Braun, former technical director of Germany's V-2 project, at Redstone Arsenal. Standing over 60 feet, *Redstone* incorporates startling advances in missile design. Chrysler Corporation is in production.

Also being groomed is Army's newest missile, the close-support *Lacrosse*. Little is known about the weapon except that it uses solid-propellant.

Generally similar to the Air Force *Matador*, Navy's *Regulus* has been in quantity production for several years. A tail-less design with a single vertical fin, *Regulus* is launched by two boosters. Its jet engine gives the seven-ton missile a cruise speed of 600 mph over a 200-400 mile range. It was carried in a watertight hangar aboard the submarine *Tunny* before launching at sea, and will be tested operationally by the nuclear-powered *Nautilus*. Navy plans to multiply its performance and range up to 1,000-1,500 miles.

Priority development has been afforded air-to-surface weapons, missiles carried by manned aircraft and directed into ground targets.

First of the GAM (guided aircraft missile) series is Air Force's Bell GAM-63 *Rascal*, to be carried by B-47 and B-52 jet bombers. Released from 40-45,000 feet, a three-chambered rocket motor sends the missile to 60-70,000 feet. The bomber guides the *Rascal* in level flight at 1,500 mph to target, where it is dived with tremendous speed. *Rascal* has been extensively flight-tested.

A future missile cloaked in secrecy is the jettisonable belly pod of the Convair GRB-58 *Hustler*, a 1,000 mph, delta-wing bomber. The intercontinental radar will carry a special rocket-powered pod to be directed from great distance with supersonic speed. Navy has four air-to-surface missiles —the *Gorgon* 5; the *Bullpup;* the Eastman-Kodak *Dove*, which utilizes a heat-seeking guidance system; and the Fairchild *Petrel*. The latter is helicopter-launched, has a jet engine, and carries special seeker equipment which directs the missile to submerged submarines.

Of greatest interest to city dwellers are the missiles designed to protect cities against enemy bombers. These include missiles fired from the ground; those launched from fighter planes; and full-sized pilotless interceptors.

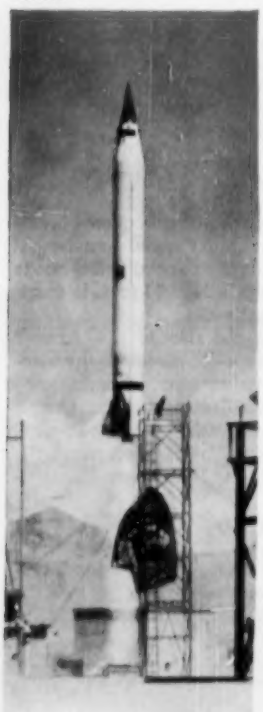
Air-to-air missiles are effective from 2-10 miles from the mother plane. They employ a variety of guidance systems including radar beams, and "seekers".

Recently USAF placed in service the sensational Hughes GAR-98 *Falcon*, lightest and smallest guided missile in production. Up to four *Falcons* may be carried beneath the wings of a fighter like the F-102A.

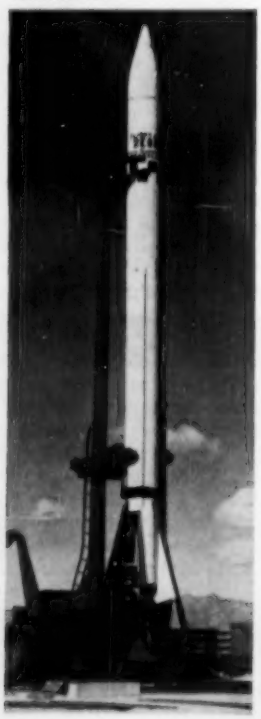
The comparable Navy weapon is the Douglas-built *Sparrow I*. The needle-nosed missile reaches Mach 3 speed, has a five-mile range and exceptional accuracy. These are the only air-to-air missiles now operational, but much is expected of Navy's *Sidewinder*, as well as a new USAF series.

The first surface-to-air operational missile is Army's

VIKING



CORPORAL



TERRIER

Nike, now guarding 13 key target cities. Once priority requirements have meen met, other cities will receive *Nike* batteries. A solid booster kicks *Nike* off a railroad launcher, after which a liquid-fuel motor builds up to 1,500 mph with an effective reach of 60,000 feet and 18 miles. Steered by movable nose vanes, *Nike* with a "kill" ratio of 65 per cent, carries a minimum of guidance equipment. It rides a radar beam from equipment to target, with flight corrections determined by an electronic computer and radio-transmitted to the ascending missile. This simplification of the weapon itself results in a tremendous cost savings; the ground control system has more than 1,500,000 components.

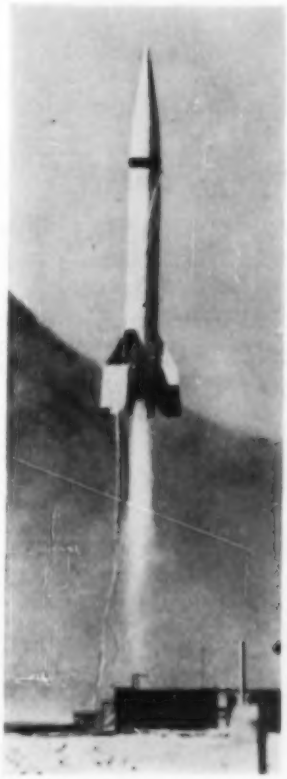
Other missiles vary from the *Nike* concept in that they can be employed in a tactical situation, with impermanent launching facilities. Thus Navy's Convair *Terrier*, a ship-to-air 1,500 mph missile, riding a radar beam 20 miles and to a ceiling of 52,000 feet, can be launched singly or in salvos. Several thousand *Terriers* have been built and the missile continues in quantity production.

A future Naval defense missile, the McDonnell *Talos* utilizes ramjet power and rockets to extend its range. Several variants are being developed to extend the kill range of warships and fixed installations. These include the *Talos W* and *L*, and from these has come the still top-secret *Triton* for Army.

Also under development and in limited production is Army's new *Loki*. A sharp departure from complex electronic missiles, *Loki* is an anti-aircraft barrage rocket system which throws up a fire wall. Still secret, USAF's Raytheon *Hawk*, a solid-propellant missile, eliminates the blind spot of defense systems like the *Nike*—the fast, low-flying airplane.

Electronic-control missiles are a tremendous improvement over the radar-directed AA gun. (The banks of 88 weapons in Germany in WW II required an average of *50,000 shells* against massed fleets of slow-moving bombers to down a single aircraft.) In many respects they are more reliable than fighter planes yet they offer only perimeter defense. This is only a partial defense solution, for the Russians are developing air-to-surface missiles, counterparts of weapons like the GAM-63.

There are two ways to parry this threat; more long-range, all-weather fighters, or, a new concept in anti-bomber weapons. The latter already is evolving in the *Talos*. But the weapon most required is a long-range pilotless interceptor—a robot airplane which can be launched quickly, ascend to tremendous altitude and cruise at a high mach. The first (*Continued on page* 66)

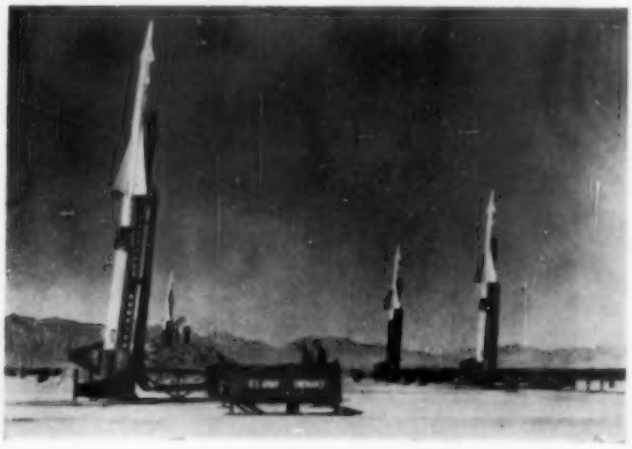


MX-774

V-2/WAC CORPORAL

GAPA

NIKE



SHADES OF THE BUFFALO

A unique method of "branding" the ferocious Wood Bison of northern Canada has been developed by use of the helicopter.

By FRANCIS DICKIE

IN NORTHERN CANADA is the largest wild animal sanctuary in the world, 175 miles long by 145 miles wide, containing 17,000 square miles. Mammologists of the Canadian Department of Northern Affairs and Natural Resources are using a unique method to painlessly "brand" the ferocious Wood Bison of subarctic Canada. After much study, it occurred to the scientists that the most feasible method of placing identification on these extremely wild animals would be from a helicopter.

The next problem was to find a satisfactory dye with which to mark the animals. After careful testing, this was found to be regular sheep dye. There were four colors used on sheep—red, orange, yellow and green. Red, green and yellow were chosen for the Bison. The dye is shot from a trombone type fire pump.

To be successful, the Bison branding would require some expert and daring flying. With no previous experience in this kind of work, a pilot would have to learn as he went along. Even before the start he faced a hampering difficulty. The spray gun had to be affixed outside the helicopter, right beside the cabin. But the cabin's closed doorway made it impossible to work the pump. Yet flying could not be accomplished with an open door. So the pilot would need to remove the door. This made even more difficult this first aerial work of flying within a few feet above the plunging back of a huge animal.

The helicopter was equipped with skids of metal. These made possible the alighting of the machine on any ground short of the perpendicular. When a landing has to be made on muskeg, the skids are additionally equipped with pads.

Last autumn this unusual operation, for the first time, was carried out successfully. A Bell helicopter, CFGHS, from the Associated Helicopter Company of Edmonton, Alberta, was selected. It was flown by Don Landells, a widely experienced northern airman. With him, to man the spray gun, was R. C. Stewart of the Canadian Wildlife Service. The expedition was based at Fort Smith, Capital of the Northwest Territories, and close to the edge of the Park.

At low altitude, the copter cruised till a herd of Wood Bison was located. Then an animal was cut out for marking. It was usually a bull, though some cows and a few calves were thus painlessly "branded". The roar of the copter sent the chosen beast madly running across the Arctic prairie. On windless days when the tiring animal slackened speed, the machine lowered to within five feet. What this required in handling a helicopter will be recognized even by people unfamiliar with aeronautics. With the machine directly over the buffalo's back, Stewart, manning the pump spray gun, leaned far out, pressed home the dye charge. Two shots were usually required, sometimes three, using a pint of dye with each shot on the shoulders of the Bison.

On windy days successful marking was extremely difficult. Even with the copter at lowest speed, dye could not be put upon a running animal. For not only was too much dye blown away, but gusts often carried back dangerous spray into the cabin, choking and drenching the two men. Thus on windy days the animal was chased hard. Running at top speed, in frantic endeavor to escape this hitherto unknown monstrous bird, the Bison was followed until it stood still from exhaustion. Then the machine descended to almost touch its hide, making dye marking perfect. Even when this was done as a safety and economical measure, a sudden gust filled the cabin.

During autumn of last year, 85 animals were painlessly "branded"; 35 red, 30 green, 20 yellow.

At this point, the reader will likely ask wondering: "But what was the reason for this highly skilled and dangerous flying; this painless "branding" of animals in the far sub-Arctic of Canada?"

The answer: It was to gather data on various unknown wildlife mammological mysteries connected with the rare Wood Bison. Thus, to make completely understandable this extraordinary experiment, a brief history of the Wood Bison is necessary.

The Wood Bison (Bos Athabascae) or buffalo to use the common, though incorrect, word, is the nearest prototype of the first animal life to cross from Asia, via Alaska, to North America—perhaps a million years ago. The (*Cont. on page* 72)

Illustrated by Ed Valigursky

The tie-down at an average airport (above) may become a shambles (below) when a windstorm strikes.

IF YOU HAD BEEN a traveler of a hundred years ago, your first job, when stopping for the night, would have been proper picketing of your horse. In pioneer days, many a fine horse was lost forever —simply because his owner did not know when his horse was picketed and when it was not.

Sometimes the rope was too light, or the knot improperly tied or the ground was too soft and the stake pulled up. At other times the crafty steed chewed the picket rope in two and made good his escape, and because said owner did not know "when was a picket."

Sadly enough, the same is true of man's fastest present-day mode of travel, the airplane. Hundreds of expensive private and commercial planes are lost every year because their owners did not know "when was a tie-down."

If you have ever seen the wholesale destruction that has followed when a blitzing windstorm has hit an airport, you have also heard a symphony of plaintive voices, mumbling such observations as the following:

"If I had only driven my stakes deeper!"

"If only I had replaced those rotten ropes like I intended to."

"I can see, now that my ship is on its back, that I used the wrong kind of knot."

"If I had only bought ⅞ inch ropes, instead of that darn twine."

"If I hadn't left that slack in my ropes, I'd be 'in' ten grand today."

"If I had tied down the tail too, instead of just the wings; if I had tied down with the nose into the wind; if I had locked my controls, there'd still be fabric on them," etc.

Worse still, every pilot in the United States seems to know the proper kind of tie-down equipment. But when the big, unexpected wind hits, it always happens to be the day that something was wrong with his tie-downs. And, some lucky overhaul shop gets to rebuild a plane. It is

Good double chocks like these keep plane from shifting position.

Some airports supply chain tie-downs in permanent parking areas.

Many a good airplane could have been spared costly windstorm damage if it had been properly secured, which brings up the question—

When is a tie-down?

By WAYNE BROWN

seldom indeed that storm damage does not result in major repairs to the aircraft.

On one storm-wrecked airport I visited lately in the midwest, every plane on the field had been tied down at the time the storm struck. Yet there was more than a million dollars worth of damage to parked planes on the field. The assumption follows that something could have been wrong, tie-down-wise.

But how does a pilot know "when is a tie-down"?

In the above case, many of the damaged planes were tied down with old ropes, which snapped with the strain. Others were tied with small ropes; still others with a single-strand tie-down.

But look at the tie-down rope in illustration "A"—a double-strand tie-down with a heavy, fresh manila rope that is *tied to the strut.*

Of course, old hands in the flying business can, and usually do, picket their ships so they will ride out any storm within reason. An old, 5,000-hour man has always seen a few planes blow away in his time.

But what of the new owner, or the chap who goes on cross-country into an area where storms come more suddenly and fiercely than back home.

By and large, he's the man who needs to know about tie-downs, especially if he doesn't live in an area plagued by high winds. In which case he'll be lax in his tie-down habits, much as the old-west tenderfoot was lax about picketing his bronc, after dealing with too many gentle horses back east. When he came west and staked out a mustang with a shoestring, he awoke on the morrow sans steed.

But how does any pilot know when his sky-cart is tied down and when it isn't? Let's have a look at the problem.

In Billings, Mont., the author and a handful of men, women and children once rode out a lulu of a gale without the loss of a single plane, and with less than $50 damage in a total of more than 100 aircraft. Wind blew steadily at 55 mph with gusts to 75.

How did we save the planes?

I was enroute to Billings when the storm struck; winds were 50 mph when I landed. Three men came out and "walked" my *Champ* to the tie-down line, where they held it until I could tie it down with new ⅞ inch manila ropes which I carried in the plane. I used the same type of knot shown in illustration "A," the sheepshank. The *Champ* rode out the storm with flying colors.

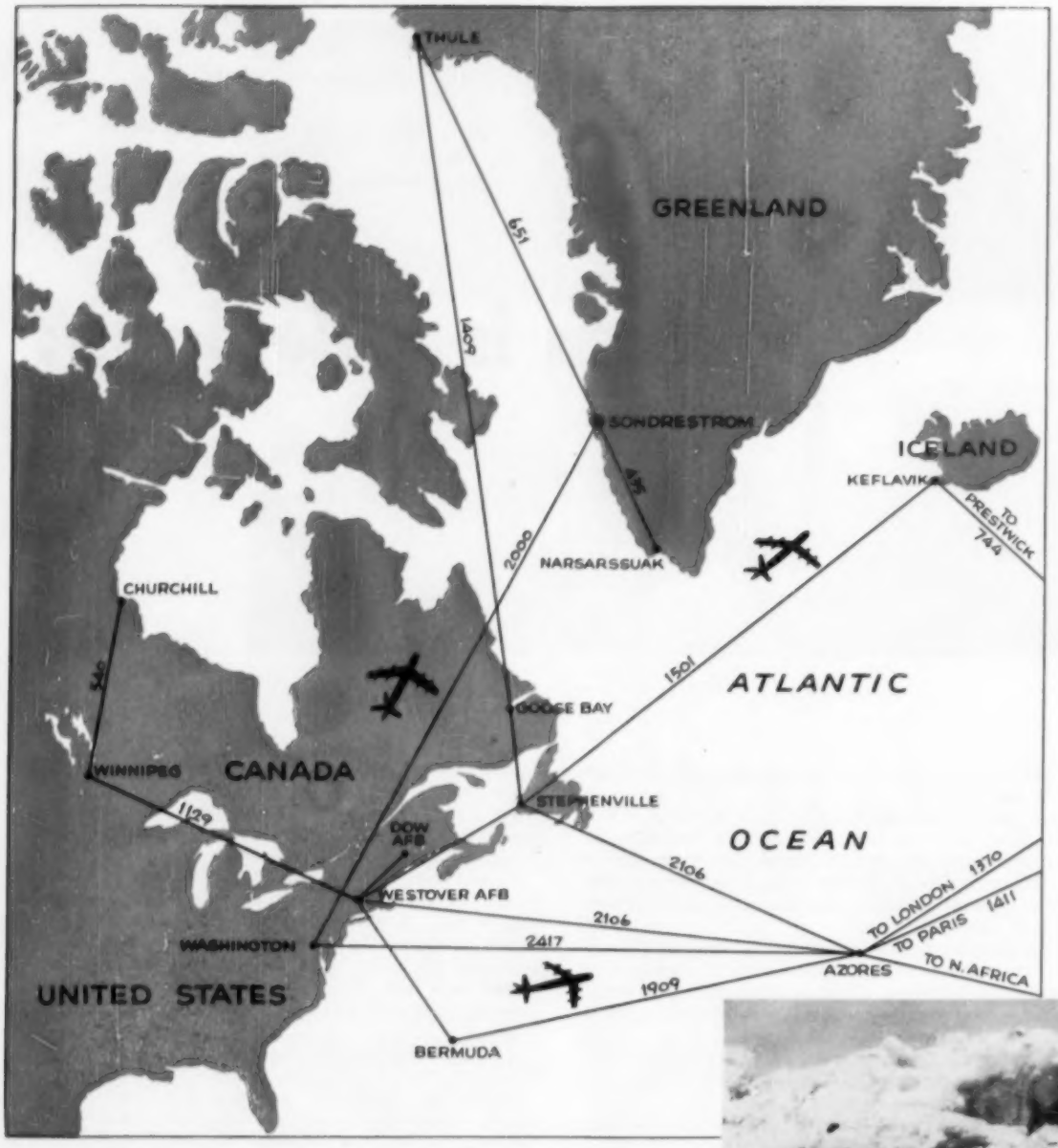
However, during the two days and nights that the high winds persisted, the severe strain caused by the gusts frayed, and would have snapped all the older tie-down ropes on the field. Day and night, we policed the planes keeping a constant check on the condition of the ropes.

When a rope began to fray, and before it could snap, we safety-tied the ship with anything available—cable, barbed wire, control cables, and in one case, a 2½ inch logging chain we found in a logger's pickup nearby.

Damage? Fabric broken on (*Continued on page* 68)

A Fresh, heavy manila rope tied in sheepshank knots.

B Coiled spring steel tie-down stakes last forever.



Left: USO show at Sondrestrom. Above: One of nature's bridges on Greenland ice cap.

SONDRESTROM

to-day is a far cry from the ruins of a Viking village nearby but there are even greater changes to come.

By DR. J. DOUGLAS BAIRD

The new transpolar flights of Scandinavian Air Service from Los Angeles to Denmark use Sondrestrom as a regular stop.

Open season for the Port of Sondrestrom is from June to November. Airlift takes over as sole source of supply in other months.

SLOWLY BUT SURELY, a once forbidding area of the North Atlantic is melting into the habitable context of the globe. We would have missed something historical and wonderful if this evolution were to have taken place and we were to have lacked the consciousness of it. I venture to write of it because there seems so many to bleat that romance is dead and so few to see that romance never was in fuller flower.

Probably earlier generations of humanity looked up from the plains of sunny Italy to the seemingly terrifying aspect of the snowy Alps and little dreamed that some day the Great Powers would come there in search of peace.

Certainly, Europeans of generations gone felt a vast remoteness from the bleak dunes of the North Sea upon which some day was to stand The Hague, temple of international justice.

And as to the Scandinavian lands—how filled with reference is ancient literature to that arctic-reaching peninsula as bereft of civilized future.

But it would seem that we who stand on the shores of the air ocean might have a clearer concept of expanding frontiers—greater faith, if you will, in our own powers to make the wilderness bloom under the revolutionary forces at our command.

Let us, for example, then turn to a single outpost of "Greenland's Icy Mountains" with the sure conviction that tomorrow is aborning. For as sure as we do not, we shall awaken some day when Sondrestrom is a familiar crossroads of our world and realize that we missed a unique romance of our time.

Just a few short years ago, Sondrestrom was an unidentifiable dot, even to the pioneers of the air age. Then when war necessity called for the ferrying of planes over the North Atlantic, the spot became the site of a weather station and, eventually, of an emergency landing strip. It was known in military parlance as Bluie West 8 and, if the sound of the word "bluie" connotes shivers to you, it connoted no less to aircrews who first used it.

Greenland, the world's second largest island, is 1,650 miles long; 750 miles wide; and covering some 850,000 square miles in area, wears an ice cap of 700,000 square miles. On the westward side of the island, 30 miles above the Arctic Circle, lies a long fiord—Sondrestrom fiord and there is situated the modern airbase, an engineering miracle of our time. Along with its sister bases, Thule and Narsarssuak, Sondrestrom is taking the eternal chill off Greenland as far as mystery is concerned. Providing platforms from to grow familiar with the potential of the Arctic, these bases are in themselves developing a certain attraction—especially Sondrestrom.

Surrounded by mountains, multicolored with foliage in summer and etching dazzling white horizons by winter, Sondrestrom, at first impression, is rather forbidding—low barracks, a collection of oil tanks, storage plants and hangars. One notes the roof of a barrack anchored by cables against the wind which can reach 100 knots per hour. The absence of trees and vegetation on the base is apt to be depressing on first glance. The snows of winter and the fine dusts of summer add nothing to foot travel.

But if one remains to peer deeper into values of the outpost, he can reap a rich harvest. There is the fiord itself, whose source is the ice cap. There is the ever-changing color of the sky which the snow-capped mountains greedily absorb so that their whiteness flames with hues of gold and turquoise and purple. To the east, the metal-like surface of the Cap created by snow upon snow through the silent ages has a weird, opaque glow. And suddenly, over all will frequently come the indescribable galaxy of the Northern Lights.

It is then not so surprising that, when one enters the barracks, he finds them brightly and often cleverly decorated. Nor should it seem sur- (*Continued on page 50*)

HANGAR FLYING

EDITOR'S NOTE: *Exchange of flying experience has been historically of high value to the development of American airmanship. Since such exchange is less feasible at modern airports,* FLYING *hopes to project that value through the medium of a monthly section entitled "Hangar Flying." All airmen are invited to contribute to this section as a service to pilots.*

RECENTLY, I EXPERIENCED not one, but several power failures—one after the other. Unless your airplane burns water and you enjoy power failures, hear me out. I can help you avoid such an experience.

I was keeping my *Ercoupe* at the North Seattle Air Park, which was being closed, so I planned on moving to nearby Bellevue Airfield. The wet wintry weather had prevented flying for several weeks and I presumed there might be a lot of condensed water in the gas tanks. I drained the sump especially well, and fired up.

While the engine was warming, I ran through the ground check and finally, taxied out and proceeded to go through the entire ground check again. Everything was perfect. I pushed the throttle in smoothly, closed the carb heat, and went racing down the runway.

The plane rose quickly into the air. Then, when I was some 60 feet up, the engine sputtered and almost died! I closed the throttle and prepared to land on the runway since there was still some of it in front of me, but as I was closing the throttle, the engine started. The sudden thrust reduced the already shortened runway to nothing. As automatically as I had closed the throttle when the engine died, I now advanced it, and was rewarded with full power.

The "Burpcup" gained altitude, but all too soon thereafter the engine sputtered out again! Under me were tall trees. I felt the temptation to bank around and land but, knowing better, held the plane straight ahead and eased the throttle back, hoping the engine would repeat its performance. At the same time, I was looking for the softest tree in the evergreen jungle ahead of me.

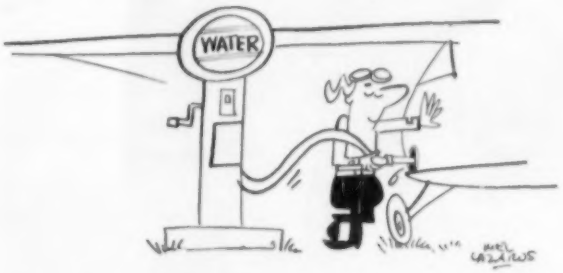
And sure enough as the throttle closed, the engine picked up as suddenly as it had stopped. Advancing the throttle, I breathed once more. I went putt-putting along some 50 feet above the woods trying to gain as much altitude as possible before the next power failure. And since the engine was running smoothly for the moment, I decided to turn back to the airport and land downwind. Just as I started a shallow bank—you guessed it, the power died again.

I closed the throttle. Nothing! I advanced it. Nothing! I was losing precious altitude. Desperately, I worked the throttle as though I was pumping up a flat tire. An eternity later, the engine leaped to life. I watched the clutching trees drop away beneath. It was like sitting in a big yo-yo. Down! Up! Down! Up!

Now the engine was running at full power, so I banked and headed for my downwind landing. I straightened out from my bank, and the engine revved back. I closed the throttle and it started. I advanced the throttle and, after a moment, it died. It became a matter of closing the throttle to make the engine go, and advancing it for power, which in turn made it die. Gradually, however, the periods of full power before failure increased. By the time I approached the airport, the engine was running properly. I now had sufficient altitude to select an emergency landing spot in the event the engine died completely, so I elected to proceed on to the Bellevue Airfield, where I finally landed safely.

Conducting a post mortem, I offer the following deductions. The *Ercoupe* has two wing tanks, from which gas is pumped into the nose tank and gravity fed into the carburetor. When I drained the sump, I removed the water from the nose tank, but not from the wing tanks. When I applied full throttle during take-off, the water from the wing tanks was drawn into the nose tank and then into the carburetor, resulting in the power failure. When I closed the throttle, the pump action retarded, and the engine got a few gulps of pure gas. So, the power failures and power recoveries were a matter of, "full throttle meant water" and "closed throttle meant gas." Finally, all the water was burned out.

The morals here are obvious, and though they particularly apply to flyers of *Ercoupes*, I have yet to hear of an airplane that burns water.



Don't let your plane sit around without frequent engine run-up, and keep your gas tanks full. Don't leave room in the tank for water to condense.

When the plane has been idle for any length of time, first drain the sump, then run up the engine and *drain the sump again.* If you continue to get water in the sump, drain the tanks.

Finally, if you have a power failure on take-off, close the *master switch* and land on whatever is left of the runway. If you just close the throttle, the engine may start again and you can find yourself playing tag with the trees.

TURRELL V. WYLIE

Seattle, Wash.

I'M A SADDER, BUT I hope wiser, Rob Draper. And I'll tell you why. I had a commercial license and flight instructor rating, and had accumulated several thousand hours—over 600 in the type airplane I washed out.

My trouble began with purchase of a new airplane. I landed at the home airport one afternoon and, met by my wife, two little daughters and a friend, gladly agreed to take them for a ride.

I put them in the plane, my friend in back with my wife and youngest daughter; my ten-year-old beside me in the right-hand seat as "co-pilot." A single lap belt held the three passengers in the rear seat, and the two front seats were each equipped with a lap belt.

After take-off, we cruised 15 minutes admiring the performance of our beautiful new plane. Then it happened. The engine began to sputter and lose power. I noted that both the fuel pressure and left gas tank read zero. I had been aware that the left tank was almost empty but hadn't

worried about it since the right tank was full. I reached for the gas selector valve and turned to the right tank. To be on the safe side, I looked for a landing field and started working the wobble pump. The engine continued to burp and falter. It was a relief to spot a nice level field.

I approached high and slowed up, as I saw I might overshoot. At the same time I put the gear down along with the flaps. The plane stalled and fell out from under me with a "whoosh." Fortunately, the wings were level and the nose was down only a few degrees when we pancaked.

I was flung forward against my safety belt (which remained intact). My chest hit the control wheel and the end of the column. I lost two front teeth, had a broken nose and three broken ribs. My ten-year-old daughter beside me, was also flung forward and lost a number of teeth and had her face cut. My wife, friend, and daughter —seated in the back also received facial injuries when they jackknifed over their safety belts and struck the back of the front seats.

Later, I went over and over the whole thing, and I learned—to my chagrin—that the selector valve and wobble pump unit in my new airplane was of a different type than the one in an earlier model of this plane. Just a simple matter of a small change in the way the gadget worked started me on the way to disaster. I had failed to check myself out on proper operation of one of the most important controls of my new airplane.

Likewise I pondered on the wreckage of my plane. The cabin was almost completely intact except for the floor pushed up a little and the instrument panel dented. I was forced to the realization that none of us should have been hurt. Protected as we were by the cabin shell, if the five of us had been held firmly in place with shoulder harness, we could all have walked away with nothing to regret but damage of the new plane.

Accidents aren't confined to the inexperienced and "show-off" pilot. They can happen to anybody who gets careless. When I can afford to buy a new plane, (1) I will study avidly the plane's flying characteristics at low speed, and (2) I'm going to make sure that each seat is equipped with a good strong shoulder harness.

ROB DRAPER

New York, N. Y.

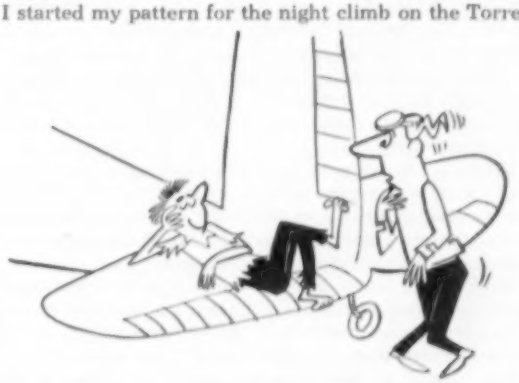
FIRST FOR DATA on myself: Started flying on the CPT Program in 1940. Joined the RCAF in 1941. Transferred to the Mexican Air Force in 1942 and after 1943 was employed by Compania Mexicana de Aviacion, Aerovias Braniff and LAMSA Airlines, which used to be subsidiary to United Air Lines. Since then have been employed as exec pilot to Alfredo Medina, a wealthy Mexican lumberman.

The time of my story was while flying with LAMSA as a Check Pilot. It was the 9th of October, 1950. I was bringing a night flight from Ciudad Juarez to Mexico City, with a midway landing at Torreon. We took off from Torreon about 11:30 p.m. with 21 passengers, an extra member on the jump seat and full load. The weather was beautiful, and most of the passengers were getting ready for a three-and-a-half hour non-stop flight, anxious to get to sleep.

We taxied to the far side of the field, as we had a southeast wind. I parked 90° to the runway, put out my landing lights and turned on all the cockpit lights. I checked both engines, instruments, etc., and after getting clearance from the tower, lined up with the runway and took off.

I noticed about halfway down the runway that the airplane was very tail heavy but was picking up speed normally. I let it roll until it gained 100 mph and pulled it gently off the ground. As soon as the gear went up, I noticed a vibration, which at the time I thought was from an unbalanced wheel still rolling. I braked the wheels but the vibration did not stop. Checked the cowl-flaps as I thought they might have been left open, but they were on trail position. When the co-pilot throttled back to climbing power, the vibration stopped and I forgot about it.

I started my pattern for the night climb on the Torreon



Range, and after climbing for 20 minutes, levelled off at 12,000 feet. When I had my power set for cruising, had closed cowl-flaps, etc., I noticed that as the airplane had picked up speed, the controls were shaking back and forth slightly. It was a vibration never noticed before. I checked just about everything (*Continued on page 70*)

No matter how small the plane nor how experienced the pilot, memories sometimes need jogging. Here is how to make your own

FLIVVER CHECK LIST

By TED DUROSKO

EDITOR'S NOTE: *I have noticed from extensive study of private pilot accident reports, how frequently occurs the phrase, "I forgot". "I forgot to pull on the heat control . . . I forgot to make sure the switch was off . . . I forgot to make sure the gas gauge wasn't stuck."*

Now I have a great sympathy with these "forgetters". The business of forgetting is as old as the human race. Why a pilot who rushes out to an airport and climbs aboard his "flivver" a few times a month does not forget more than he does, is something of a mystery.

But the fact remains that "forgetting" is an arch enemy of air safety, and that something definite can be done about it. The professional pilot has long since fortified himself against "forgetting". Why not copy him in small plane cockpits?

FLYING THE FLIVVERS—the *Cub*, Aeronca, Mooney *Mite*, Taylorcraft, Interstate and the like—is fun! The airplanes are economical, have slow landing speeds, short landing rolls, adequate stall warning characteristics, and good airworthiness records. They can be flown with a degree of proficiency after eight or nine hours of dual instruction.

However, as easy as they are to fly, the fact remains that there is a proper way to treat them. By following the recommendations of airframe and engine manufacturers, the airplane will perform faithfully and maintenance cost will be kept at a minimum.

Most pilots learn proper techniques in their student days but, after acquiring a pilot's license and being on their own, soon forget many of the finer points. Perhaps more so when they fly only several times a month.

For a pilot in this category, a device called a check list is imperative to good airmanship before, during and after every flight. A check list hanging on the cabin heat control or engine primer is a constant source of pertinent information.

And where does one get such a check list for a flivver ship? Well, the easiest way is to make one. By consulting the flight manual of the aircraft involved, all the necessary information can be found.

Then it is just a matter of arranging the information in an organized fashion, after which it is typed or printed on a 4 in. x 8 in. card. The front side of the check list covers from "Before starting the engine" to "During flight." On the reverse side, the memory-jogger covers "Before landing" and "After landing." The card is placed between two pieces of celluloid 4 in. x 9 in. and the edges sealed with scotch tape. A small hole is punched in the edge of the card, and a string attached. Now the check list can be hung at any convenient spot.

Just what information should be included on a flivver check list? It should be complete in detail to be of service to the "weekend pilot." To illustrate this, the following is a check list designed for a Piper *Cub* powered with a Continental 65-hp engine. Incidentally, the same basic check list can be used for other type flivvers and engines by substituting information found in the aircraft manual

PILOT'S CHECK LIST

Piper Cub N-0000 **Continental 65-hp**

BEFORE STARTING ENGINE:

1. Check aircraft visually for removal of anchor ropes. (This does not include wheel chocks which should be left in place until the aircraft is ready to leave the line.)
2. Check weight and balance clearance. (Remember improper loading will alter the airplane's flight characteristics.)
3. Determine fuel supply.
4. Ignition switch OFF.
5. Throttle CLOSED.
6. Fuel valve ON.
7. Carburetor air heat COLD.
8. Pull propeller through 3 to 5 compressions.
9. Turn primer knob slightly to unlock. Pull out and push in slowly. Repeat 3 to 4 (*Continued on page* 75)

Right: The electronic eyes of the transmissometer begin with this tower device being checked here by S/Sgt. John W. Kocher. Pilots and meteorologists alike all hail the transmissometers as a big connecting link in flying safety.

Below: A/1C Morgan Jensen, Weather Forecaster at Fairchild AFB, checks visibility recording on a transmissometer. Machine works equally well by day or night and registers visibility from "unlimited" down to a few feet.

VISIBILITY— ON THE BUTTON

is provided by a new "miracle weather machine" operated by Strategic Air Command.

By DAVID E. WILLIAMS

ONE OF THE MORE remarkable safety devices now in use by the Air Force is called a "transmissometer".

To date only two of these machines are in operation at Air Force installations; one at Fairchild Air Force Base, Washington, D. C.; the other at Andrews Air Force Base, Maryland. Others are scheduled as soon as installation programs permit.

Utilizing the same principle as the electronic eye, the transmissometer records the density of air samples within a designated runway area. The machine then translates the reading into terms of visibility.

Built at a cost of $3,800, which includes installation, the transmissometer has been in "around the clock" operation at Fairchild since December, '54. From the outset, weather personnel have been lavish in their praise of the instrument and its accuracy. They acclaim it as a real time saver and a definite aid to flying safety.

Structurally, the device is hardly spectacular.

Two 15-foot towers are located 500 feet apart, alongside the end of the runway. The area from which the "air sample" is taken is the exact area first seen by an incoming pilot. A beam of light is constantly transmitted between the two towers. From its source in the first tower, the beam is focused into a photoelectric cell atop the second tower.

The cell measures the strength of the light beam as it varies according to atmospheric visibility. An amplifier transforms the light intensity directed upon the photoelectric cell into a visible pulse beat. As visibility increases, the light beam becomes stronger, and the pulse quickens. As visibility decreases, the light beam grows weaker and the pulse beat slows.

Variations in the pulse beat are measured in numbers per second. The pulse signals are relayed through telephone circuits to recording instruments within the weather station where they are graphically recorded in terms of runway visibility by miles and fractions thereof.

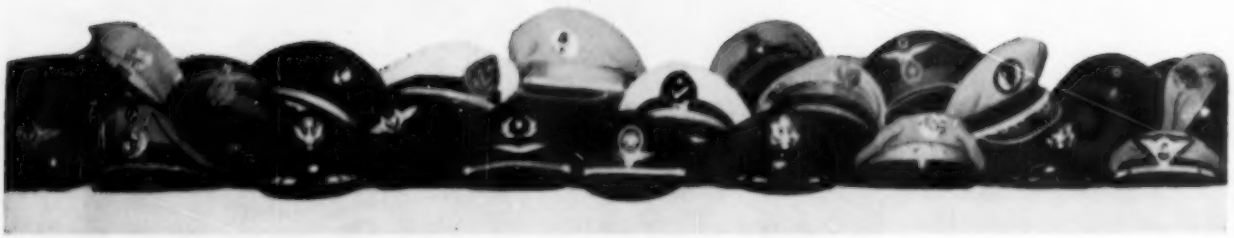
Readings can be taken as frequently as desired by weather personnel and relayed to approaching aircraft; and also be used to supplement normal weather broadcasts.

Before development of the transmissometer, and still routine procedure at most places, readings were acquired by "sighting" of objects at known distances. Findings were subject to human error. Two observers "sighting" the same object at the same time might report two different visibility conditions. The transmissometer removes the guesswork.

Additionally, it saves manhours. Before the transmissometer installation at Fairchild, it was necessary under heavy traffic and acutely changing visibility, to station weather personnel at the end of the runway to relate momentary conditions to the tower. These have been freed for other duties.

Thus, though small in size, inexpensive in cost, and simple in design, Strategic Air Command has found another long needed aid to precision in handling the high speed dreadnaughts of its air ocean fleet. END

AMERICANS ALL



Pan-American solidarity is cemented by the United States Air Force School for Latin America.

BECAUSE MOST ACUTE problems in world affairs stem from the perimeters of the Soviet Union, our eyes are turned all too infrequently on a happier scene—southward.

Yet from our own southern border to Cape Horn there is more of optimism than of pessimism, more of unity than of friction. This is not to say that the Western Hemisphere is one vast smiling area of sweetness and light, but it is to say that Pan American concepts have sturdily made progress in an infinitely troubled world.

From time to time, we have heard of an unpublicized fraternization program conducted at Albrook Air Force Base in the Canal Zone. Some officer or airman of one of the Latin American countries would drop by to tell us of his happy existence there; or we would hear from an old friend that he was putting his Spanish to good use as an instructor at the Air Force school. Finally our curiosity was aroused to the point of delving into the subject and the facts are as follows.

First, we should probably explain that the whole ball of wax south of the border, as far as the United States is concerned, heads up under the Air Force's Caribbean Air Command. This Command is charged with several primary responsibilities—to lend assistance to Latin American air forces through a series of air missions—to assure the air defense of the Canal Zone—to administer the air phase of the Mutual Defense Assistance Program (MDAP) —to furnish logistic support for the Inter-American Geodetic Survey—and to provide disaster relief of search and rescue service wherever in Latin America a need arises. Army, Navy, and Air Force are, of course, teamed for joint activity on the Isthmus itself.

Through the system of missions, 14 in number, technical assistance is rendered the various Air Forces of the Latin Republics. Standardization of aviation equipment, along with unified tactical and strategic concepts is the objective of Mutual Defense Pact authorities. Mission personnel, officers and men, are selected according to the separate needs of each government concerned. Currently, missions are operating in Bolivia, Chile, Colombia, Cuba, Ecuador, Guatemala, Haiti, Honduras, Nicaragua, Paraguay, Peru, El Salvador, Uruguay and Venezuela.

The Air Force School at Albrook in the Canal Zone was not an originally planned effort. It grew spontaneously out of a grass roots need. Back in 1943, the Chief of Staff of one of the Latin countries asked if he might send a score of his airmen to watch U. S. mechanics at work on the flight line. The answer was affirmative and, within a few months, other groups from other Latin Republics were asking to join the show. This worked into an on-the-job training program.

The end of the war seemed to terminate such needs but, by 1947, the Western Hemisphere realized that the song of the bluebird sounded strangely like the growl of a bear. Authorization was made to establish a formal USAF school for Latin American airmen.

The school has had far reaching impact. To date more than 2,000 officers and technicians from 18 Latin Republics have been graduated. All instruction is given in Spanish by bi-lingual American officers and technicians. At the same time English is a basic course, so the student body is also bi-lingual by the time of graduation.

The school curriculum is departmentalized into 18 different specialties. Among these are synthetic flight training, radio communications, aircraft armament, control tower techniques, engine overhaul and kindred matters. It is all practical and down-to-earth airmanship.

Student quotas are distributed according to the most pressing need of each country, and airmen selected by the various Air Forces to attend the school are naturally of the highest calibre obtainable. In most cases the graduates return to their own countries to fill key positions. Not only have they had opportunity to learn American standards and methods but have as well gotten to make extensive contacts with other Latin American airmen.

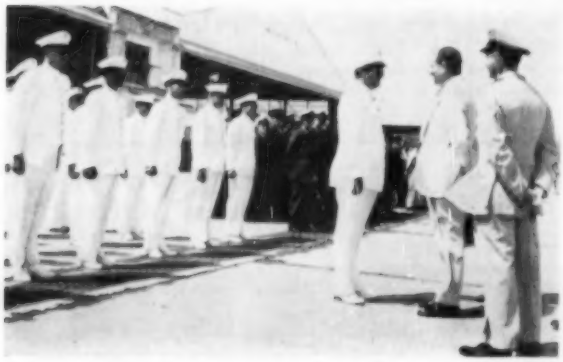
Although keeping abreast of latest aeronautical developments, courses are designed to fit the existing conditions of the various Latin Air Forces. U. S. airmen visiting the Canal Zone should also visit the school and see what good neighbors and allies we have. G.R.W.

T/Sgt Juan Fernandez (center), an instructor for USAF School for Latin America, demonstrates wing attachment of an F-86 to students.

Above: An instructor, S/Sgt Rafael Herrera, explains the operation of propeller governor test stand to Latin American students at the School.

Below: During visit to Caribbean Air Command at Albrook AFB, Canal Zone, March 1955, Hon. Harold E. Talbott, Secretary of Air Force, toured USAF School for Latin America.

Above: Colombian airmen attending USAF School for Latin America, were honored by visit from their Minister of War, General Berrio.



Below: USAF instructor, M/Sgt Max E. Nissenbaum, demonstrates an aircraft traffic problem in a course on Aircraft Control Tower operation.

TO PROBE HEAT BARRIER Bell's rocket powered, supersonic X-2 is the first airplane designed and built to probe the heat barrier. From a drag and power standpoint, it is designed to surpass the speed of the Bell X-1A which reached a record-breaking 1,650 mph. Built of stainless steel and K-monel to withstand a much higher melting point than aluminum, the X-2 is powered by a Curtiss-Wright rocket engine capable of developing power almost equal to that of a modern cruiser. Lt. Col. Frank K. Everest (left), Chief of Flight Test at Edwards AFB, Calif., has been selected as test pilot.

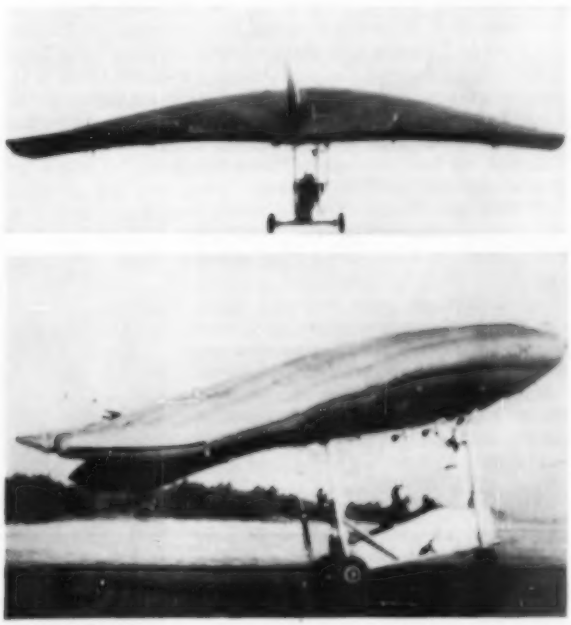
HAVE YOU SEEN?

NATO DIVE An American, a British and two Canadian planes dive vertically toward earth on completing a loop in an unrehearsed formation over France. Leading is a British Hawker *Hunter;* on either side are two *Sabres* of the Royal Canadian Air Force; and in the box position, upper left, is a U. S. Lockheed T-33.

LIGHT JET TRANSPORT Fairchild Aircraft Division's proposed bid for the executive transport market is shown in this artist's conception of a plane that would cruise at 560 mph. Bearing the company designation of M-225, the transport is equipped to carry a crew of two and seven passengers, and is designed to be powered by four Fairchild jet engines. It is one of several projects now in advanced planning stage at Fairchild's Hagerstown, Md., plant.

CAMAIR 480 Now in full production, the Camair 480 incorporates a number of recent modifications including redesigned nacelles, with fiberglas nose cowl on each engine; 10 per cent additional angle back for augmentor tubes; redesigned landing gear; gross weight increase to 4,323 lbs., and useful load to 1,383 lbs.; redesigned landing gear down lock; improved fuel vent system; an angular change of the horizontal stabilizer, giving another 4 or 5 mph; installation of top quality flame-resistant upholstery, leather trimmed seats and complete carpeting; general aerodynamic clean-up program to increase performance. Powered by two 240-hp Continentals with Hartzell full-feathering constant speed props, the 480 is a re-manufactured aircraft based on the *Navion* airframe. Price of $39,000 includes two 38 gal. tip tanks, complete gyro panel, more than the usual standard instruments and gauges, and a Lear LTRA-6 with 3 crystals. Cruising speed with 70 per cent power at 6,000 ft. is over 197 mph; with 65 per cent power it is over 190. Rate of climb on two engines is over 1,750; on single engine it is 490. Two engine service ceiling is over 21,000 ft.; on single engine 7,600. Single engine absolute ceiling is 9,100 ft. Wing loading is 23.45; power loading 9.01. Total fuel capacity is 107.5 gal., and range is 900 miles.

STABLE MABEL Using only kinesthetic control (body movement) for all normal maneuvers, test pilot Norman M. Lloyd demonstrates the Kellett KH-15's gyro-stabilizing system. Power is supplied by Reaction Motors' hydrogen peroxide rocket engines at each blade tip. Two spheres on sides are fuel tanks.



BALLOON WING Filled with compressed air by an automobile tire pump, this unusual British craft has a two-place wooden cockpit, a 65-hp. engine, range of about 100 miles and maximum speed of about 45 mph. Weight is 550 lbs. Wing is detachable for storage. The craft is built by M. L. Aviation Co.

I learned about flying from that !

The night was no longer beautiful when this jet pilot found himself on the verge of panic.

By ROBERT R. BRACKETT, 1/LT., USAF

I'VE 12 years in single-engine aircraft ranging from *Cubs* to the supersonic F-100, but regardless of types, the problems of flight will be the same as long as humans are at the controls.

After Korea, I was assigned as Flight Commander to an F-86 Fighter Squadron on the Mojave Desert. The flying was great—lots of aerial gunnery and fighter tactics. As time rolled by, our semi-annual flight requirements for night, instruments, and total time became due. Everyone had flown required minimums except one pilot, just back on flying status after two and a half years in a Red prison camp. We decided on a weekend cross-country to get some of his time caught up.

Getting the C.O.'s permission, we grabbed two F-86's and leaped off, planning to spend the first night in Florida, the next in Chicago and thence home via Salt Lake City.

We left Chicago on the way home, for Rapid City, S. D., penetrated a solid overcast and broke out on top at 42,000. I was flying wing on this leg and this was the first weather we had encountered so far. On our clearance at O'Hare, Chicago, we had requested "flight following." Let me tell you about this stuff; it's great. After you are airborne and have permission to leave tower frequency, switch to the proper channel for GCI (radar) and give them a call, using their coded call sign. They will establish positive identification of your aircraft. Then tell them where you want to go and they will do the rest, if you can just follow directions. When we got to within 80 miles of our station, the GCA had our let-down clearance, which was straight in on course. We broke out at 18,000 with the field dead ahead. This GCI showed me a heap.

After landing, we informed the alert crew that we wanted full service on the aircraft and being lazy and in a hurry to get home, rushed off to the mess hall, failing to pull a post-flight inspection on our aircraft. After feeding our faces, we checked the weather and made out our clearance (IFR) for Hill Field, Ogden, Utah. The 10:00 p.m. weather sequence at Hill was reporting 8,000 broken and ten miles visibility. The weather man informed us of a front sitting about 50 miles west of Hill, but it was barely moving and, since we would be there in a short time, it shouldn't cause us any strain.

When we got back to our aircraft and started the walk around inspection, we found that one of the hydraulic accumulators had a low air charge. By the time the alert crew found an air compressor and got it refilled, we had lost almost an hour, so I called the tower by radio and asked if they would get my weather extended, which they did. If there had been a change of any great amount of weather, I would need to go back to base operations and get it noted on my clearance. All this time wasted could have been prevented if we had post-flighted our aircraft.

As fate would have it, we got strapped in ready to go and the auxiliary power plant, a unit which supplies electric power for starting, would not work. This took another half hour of fooling around. When we finally did get off, we were dead tired. Yes, Jets are fast but only after you get them in the air. I was leading this leg of the flight and since the distance was under 500 nautical miles, 30,000 feet would be high enough for fuel conservation. I got GCI to follow us as far as they could, to Sinclair Radio. From that point on, there was no GCI but we had airways the rest of the way. I thanked GCI and switched back to the CAA channel and gave Sinclair Radio a position report.

The author climbs into the cockpit of an F-100.

Boy, this was a beautiful night. A full moon made the sky almost as bright as day. Those clouds were beautiful too. Then I thought, "Wait a minute; cloud was supposed to be scattered in this area, and we are on top of a solid overcast. As I looked on ahead to the horizon, I could see dull orange flashes. "Oh-oh, lightning! Guess I had better call Ft. Bridger Radio and get the latest Hill Field weather." We would be in there in another 20 minutes. Pretty soon a pleasant voice said that Hill was reporting an estimated ceiling of 1,000 feet, three to five miles visibility with rain. This hit (*Continued on page 73*)

The World Must Listen to Airmen

(Continued from page 21)

the Air Force Academy opens up a whole new era for U.S. airmen of the future. Together, they reveal a more pronounced shift in thinking than in some other countries. On his own part, the American airman seems also increasingly well-informed on world affairs, politics and economics, and over-all global strategy.

This air-mindedness has already had concrete implementation: one has but to read the almost constant Soviet complaints about the great overseas American air bases to realize how seriously it appears to the masters of the Kremlin as a deterrent to open war.

It is, of course, in the interest of the Soviets that the West should believe them able at any moment to strike hard and fast; and to encourage the thought that all-out war will bring no winner, only universal devastation. This is one of their chief propaganda weapons. Yet Soviet leaders know what, for some reason, Western statesmen hesitate to say openly: that the one certain result of nuclear war with the United States could be only certain destruction for the U.S.S.R.

This is not mere wishful thinking. Air strength depends upon many related and confluent factors involving scientific research, industrial productivity, inventiveness, organization and air personnel up-to-the-very-second at the level of strategic planning. Granting all that the Soviet air forces may have, or try to give the impression that they have, they cannot hope to approach the material production of the United States, until they subjugate Western Europe and have time to consolidate their position there.

This is not to say that the Soviets could not, even now, inflict damage upon us were we to be caught off-guard. We cannot for a moment relax our posture of defense. But if war should come by a sudden attack upon us, our long-range prospects would be by no means hopeless.

The history of warfare is largely the record of new offensive weapons, followed by new defensive weapons to counteract them. Despite implications of nuclear energy, there is no reason to believe that this alternation between offense and defense will not continue.

There is, however, a great gap between the scientist, who today is responsible for technological progress in warfare, and the "man in the street". The latter may devotedly hope that the former will find the key to his protection, and find it in time. But he may well feel himself a helpless pawn in a game over which he has little control. This psychological gulf needs bridging.

The bridge, I believe, is the airman.

The airman uses the products of the scientist. At the same time, he shares many of the characteristics of the man in the street, but with an essential difference: he is accustomed to looking at the world from the viewpoint of the flying man. He knows better than anyone else the kind of tools he needs to fulfill his function as a flying man. As such, he should place in proper order of priority the scientific effort necessary to supply him with those tools.

Not every airman, of course, talks sense. Some have not developed the matured outlook which has, for example, long characterized the senior Naval officer. But this maturity will come, as men trained to the air by a lifetime of experience come more and more to posts of responsibility. This is true, even though to a degree, air experience militates against the development of an elder-statesman outlook. Aviation is always doing something new. Its whole spirit is mobile rather than static.

An airman at work with the latest equipment is always doing something that has never been done before. He is in a wholly absorbing occupation, which demands involvement of his whole self. Small wonder there are times when he appears to have a one-track mind! Yet, surely, this quality that keeps his mind flexible, that enables him to react quickly to new circumstances, is precisely what is needed today.

Who but an experienced airman can be fully conscious of air mobility and of the application of this mobility to geography? Who but airmen could first have comprehended that the most important strategic map in the world is that of the north polar region?

That all may grasp the essentials of our safety, it is the duty of airmen to make their viewpoint ever clearer. A free society can remain in health only as it knows the conditions necessary to its preservation.

It is my personal conviction that as many persons as possible should learn to pilot an airplane. Flying experience provides understanding of the air, and there is no substitute. Only a chosen few may be fit for the great strategic tasks, but every man or woman who learns to fly even a light plane is helping to bridge the gap between the scientist and the man in the street. Every civil pilot's license issued is an added factor in public air-mindedness, another step toward understanding of the power that affects us all, whether we will or no.

Most airmen are not gifted with expression in words. Yet, even so, it is their solemn duty to speak out as I have here labored to do, so that a free people may understand the implications of the air ocean and thus be able to maintain their freedom unimpaired.

The world, and not least its freely chosen statesmen and rulers, must listen to the airman. The airman must speak out, and clearly.

Therein alone, under God, lies our future and our safety. END

HELIPORT

PILOTS flying in the vicinity of Fort Eustis, Va., might see a strange object these days. But it's neither a base for flying saucers nor a highway clover leaf. It's the world's first complete military heliport—a $1,000,000 roosting place for the Army's whirlybirds.

Its X-shaped pattern consists of two 600-foot runways set within a huge circular taxiway, with eight concrete spokes, or landing pads. The hangar and shop area is capable of storing a score of 20-passenger helicopters. The facility also has hardstands, night lighting and an operations building with control tower. While designed primarily for helicopters, it can also be used by fixed-wing craft. Named Felker Heliport in honor of Warrant Officer Junior Grade Alfred C. Felker, the facility will be used to train helicopter mechanics; eventually, however, the Army plans to station a battalion of 68 cargo and 10 utility copters. Felker, enrolled in one of the Army's first helicopter pilot courses, was killed in a helicopter crash in 1953.

IF YOU OWN:
AERO-COMMANDER
TWIN NAVION
CESSNA
180—190—195—310
BONANZA
APACHE
NAVION
TRI PACER, others
YOU NEED THIS!

The NEW
OXYGEN CONSOLE

• Higher altitude flying is the "order of the day." Modern engines and radios are designed for that purpose. That calls for oxygen facilities! Above the weather, you can fly faster, get there refreshed — with less "flight fatigue." The Scott OXYGEN CONSOLE provides all these benefits for the lowest cost. It gives you amazing compactness, light weight, safety, attractive appearance and it's simple to use.

Write for complete information giving make of aircraft.

Scott
SCOTT AVIATION CORP.
224 Erie St., Lancaster, New York, U. S. A.
Export: Southern Oxygen Co.
15 W. 57th Street, New York 19, N. Y.

Sondrestrom

(Continued from page 39)

prising — although it does — to find the airmen and civilians of many nations at Sondrestrom working sympathetically and with a high esprit de corps. Slang expressions of cynicism such as "apesweat," "glacier goofy," snow stupid," "rock happy," are scarcely ever heard at this outpost.

It takes no great discernment to see that the once forbidding area to our north has intangible attractions which will ultimately lay hold on an increasing number of men, who in turn will lend themselves to its scarcely imagined resources. In such fashion have the deserts and great forests and the mountain countries throughout time come abreast of the pastoral lands. Perhaps this is the unconscious background which, like unseen seasoning in a pudding, adds zest to the work and play of life at the base. You wonder if there will come a day when no more polar bears will drift by on the ice flow; when the ptarmigan and geese and duck are no longer plentiful; when the wonderful skiing and skating will be commercialized? Sondrestrom today seems a far cry from the ruin of a Viking village which stands nearby but somehow you feel that what is to come will be a still further cry from the base as it presently exists. For example, already the University of Maryland has established its extension courses so that you can be earning your degree at old Bluie West 8!

Probably this story would be lacking something if I did not mention the sweat and tears invested to date. They have been plentiful indeed and more are to come, if history means anything.

The first commander at Bluie West 8 was Bernt Balchen. The first landing strip (2,500 feet) and eight miles of road were completed in December, 1941. In 1951 the station was closed, but in the same year, through agreement of the United States and Denmark, under the command of Col. Vernon L. Stinzi, Sondrestrom Air Base was reorganized.

It has been a tremendous undertaking to import supplies and material. Nine miles of road over mountainous country, built at enormous cost, connects the base with the port of Sondrestrom. Into this port during the open season from June to November come ships from Europe and the United States carrying supplies, mail, building equipment. During other months, airlift is the sole source of supply.

A recent contributor to the growth of Sondrestrom is Scandinavian Airlines in its new transpolar flights between Scandinavia and California. Over this top of the world, Copenhagen and Los Angeles are only sunrises apart. The 2,162 miles from Denmark to Sondrestrom are covered in 7:21 hours; from Sondrestrom to Winnipeg the 1,984 miles take 7:30 hours; and the 1,634 miles from Winnipeg to Los Angeles 5:43 hours. The stop in Sondrestrom led to construction of a Danish hotel, built of lumber brought from Denmark. Passenger lounge and dining rooms are attractive in their decor of modern Danish art. In display cases one finds Danish woolens, china, enamelware, pottery, and embroidery, as well as polar bear skins from Greenland. To care for the hotel, several attractive Danish girls have arrived on the base which, up to their arrival, had boasted of no women at all.

Summer in Sondrestrom is short, really only the months of June, July and August. May might fall under the category of spring, and September of fall, but neither constitutes a real season. In the

(Continued on page 52)

"Let's go, Mr. Fizzby. Your chute rental was up ten minutes ago."

The Young Lady on the Flying Trapeze

On September 2, 1910, Miss Blanche Scott, "an attractive and well-built aviatrix of Rochester," made the first solo flight by an American woman. Her plane, much like the contraption above, contained tricycle gear and an anemometer over the nose wheel (probably to tell the pilot when he was moving ahead), ranked as a mechanical marvel of the era.

We salute the courage of early-day flyers in embarking in these open-plumbing masterpieces, and regret BEECHCRAFTS were not available in those days. We would have liked to have offered demonstrations of the comfort, convenience and safety that modern-day pilots accept as a matter of course.

The pioneer flyers, like you, would have admired the air conditioned comfort, the quietness, and the simplicity and ease of control of the Bonanza while cruising at 184 miles per hour to wherever you want to go.

And remember (this is important) — statistics prove that corporation aircraft are now more than FIVE TIMES safer than automobiles, measured by accident fatalities per 100 million occupant-miles.

To hear more, get in touch with your BEECHCRAFT dealer or distributor, or write to Beech Aircraft Corporation, Wichita, Kansas.

★ ASK ABOUT BEECHCRAFT'S NEW EXCLUSIVE LEASING PLAN.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Now!

MET-CO-AIRE

Presents

The New

CESSNA 170 TRICYCLE GEAR

Look at this

MODERN 170

Note excellent visibility, the beautiful lines. Engineered and designed to increase the utility and beauty of your Cessna. A conversion that enhances the appearance and value of your airplane. Fully steerable with rudder pedals, assuring safe, quick stops with positive ground control at all times.

Complete kit, furnished with all necessary assemblies and hardware for simple easy installation.

OTHER MET-CO-AIRE CONVERSIONS

Tricycle Gear Conversion for the Cessna 180 will be available in the near future
Fuselages for Stinson & Piper
Metal Wings: Cessna—Stinson—Ercoupe
Auxiliary Fuel Systems
South American Distributor
Clearwater Flying Co.—Clearwater, Florida

Write Met-Co-Aire today for full details, or see your nearest dealer!

UP TO 100% FINANCING AVAILABLE

Met-Co-Aire

Municipal Airport, Fullerton, California
LAmbert 5-6521

OVERNIGHT STOPS—No. 6

SKY RIDERS HOTEL

Phoenix, Ariz.

JUST A STROLL of 75 yards from the private plane transient terminal at Beautiful Sky Harbor Airport, the new Sky Riders Hotel has everything the itinerant pilot could want.

Standard accommodation is $9 per day single occupancy; $12 double. All are actually small suites, as the bedroom area can be completely separated from the sitting room by a sliding screen. Executive suites are $15 per day single occupancy; $20 double. All units have no-charge television, Westinghouse central heating and refrigeration systems with individual unit controls, and are completely soundproof. The 62-foot tiled swimming pool is a popular feature.

Located less than three miles ESE of Phoenix, the airport has three paved runways more than 5,000 feet long; provides complete 24 hour service for transient planes including storage, major repairs, weather, lighting, restaurant, taxi, car rental. Receiver is required.

(Continued from page 50)

later month, temperatures go below freezing and there is usually some snow. The days of late September average 11.5 hours in length, but become shorter rapidly. The heaviest monthly snowfall is recorded in October, and by Christmas there may be 15 to 20 inches. The sun goes down in mid-November and rises again about the 27th of January. During this period there is a twilight, but artificial light must be used throughout the day. In December, January, and February it is not uncommon to have temperatures 35° to 40° below zero.

In March there is again enough visible daylight to have a real day and night. Winter is officially over about the middle of May, and summer arrives at Sondrestrom by June. From the 3rd of June to the 13th of August, the sun does not set.

And now, some of us, despite the many unproductive years since Eric the Red first came to Sondrestrom, and despite the presence of the Ice Cap and inclemencies of weather, think that never again, in the larger sense of its place in civilization, will the sun set on Greenland. A new race of Vikings has come up the fiord. END

PLANE FAX

Your Best Week-end Flight Plan for December

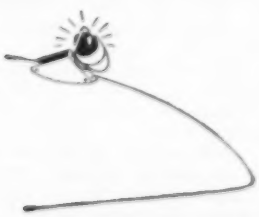
See the "Wings Over the Nation" Air Show at Long Beach Municipal Airport, December 19-20, Long Beach, Calif. You can get quality Standard Aviation products and service at the scene of the show.

Flying a tow line to a stranded army barge!

Salvage flight over breaking seas! That was Merrill Ginn's job when an ammunition barge went aground near Long Beach, Washington. Flying from his base at Clatsop County Airport, Astoria, Oregon, he succeeded, after several attempts, in laying 3,000 feet of line from the rescue tug waiting offshore to the stranded barge, where seamen secured it for the salvage try.

"Whether I'm flying over water or on a week-end hop," says Mr. Ginn, "I always use RPM Aviation Oil to keep my engine in top condition. On longer trips I carry extra cans with me, to make sure I won't have to use anything else. It really cuts down engine wear, and ends all trouble with sticking rings and valves. I use Chevron Aviation Gasoline 80/87, too. It gives me plenty of extra power when I need it, and yet I can lean it down for economy when I'm cruising."

You'll get longer engine life and better performance for your plane if you use quality Standard Aviation Products. You can get them throughout the West with your Chevron National Credit Card. Use it for overnight tie-down charges, too — no need to carry extra cash.



TIP OF THE MONTH

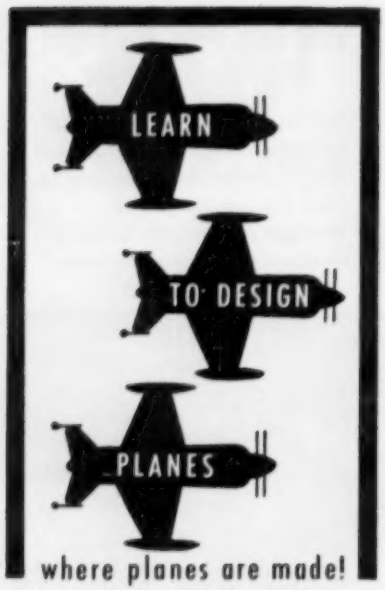
If part of your flight will be at night, it's wise to check your running lights before you take off.

"RPM," "CHEVRON," REG. U.S. PAT. OFF.

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

STANDARD OIL COMPANY OF CALIFORNIA



You are there . . . right in the heart of the industry . . . at **NORTHROP AERONAUTICAL INSTITUTE.** Douglas, Lockheed, North American, Consolidated-Vultee, Northrop, Hughes, and other famous Southern California Aircraft Plants are all around you.

Aviation leaders founded this world-famous school to supply the industry with *thoroughly trained* men. No finer, more practical training is offered anywhere. There is a *waiting list* for Northrop graduates.

SAVE TWO YEARS

Northrop courses are concentrated, yet complete

Aeronautical Engineering Technology—2 years

Aircraft and Engine Mechanics—1 Year

The time you save by training at Northrop will be worth literally thousands of dollars to you in dollars saved and extra money earned. Before many others are out of school, you can have a job in aviation . . . with the kind of training needed to zoom ahead . . . ahead of the crowd toward success.

Northrop is an

ACCREDITED TECHNICAL INSTITUTE

Northrop is

APPROVED FOR VETERAN TRAINING

Northrop training fulfills the educational requirements for Air Force Cadet and Naval Aviation Cadet training.

Take your first step toward

SUCCESS IN AVIATION

WRITE TODAY FOR FREE CATALOG

Northrop
Aeronautical Institute
An Accredited Technical Institute
1119 W. Arbor Vitae Street
Inglewood 1, California

MAIL THIS COUPON TODAY!

NORTHROP AERONAUTICAL INSTITUTE
1119 W. Arbor Vitae Street, Inglewood 1, California

Please send me immediately the Northrop catalog, employment data, and schedule of class starting dates. I am interested in:

- ☐ Aeronautical Engineering Technology
- ☐ Aircraft Maintenance Engineering Technology
- ☐ Master Aircraft and Engine Mechanic
- ☐ Jet Engine Overhaul and Maintenance

Name ..... Age .....

Address .....

City ..... Zone ..... State .....

Veterans: Check here ☐ for Special Veteran Training Information.

RUSSIAN AIRCRAFT AND ENGINE DESIGNATIONS

By KENNETH M. HAMMER

SINCE 1940 many new Russian aircraft and aircraft engines have been named after their designer or group of designers. An abbreviation of the designer's name or the last initials of the designing committee followed by the serial number (which may not always be in chronological order) is the usual method of designation. The following table shows the more important prefixes and designers:

A	Oleg. K. Antonov
ACH	A. D. Charomskii
AM	Aleksandir A. Mikulin
ASH	Aleksandir D. Shvetsov
BI	Berendjak and Issariev
BICh	Boris Ivanovich Cheranovskii
ER	Ermolaev
G	V. K. Gribovskii
HE	Heinkel
IL	Sergei V. Illyushin
KASKR	N. I. Kamov and N. K. Skrzhinskii
KTs	D. N. Kolesnikov and P. V. Tsibin
LA	Semyon A. Lavochkin
LAGG	Lavochkin, Gorbunov and Gudkov
LI	Boris Lisunov
MI	Miassishchev
MIG	Artem I. Mikoyan and Mikhail I. Gurevich
PE	Vladimir M. Petlyakov
PO	Nikolai N. Polikarpov
SHa	Engineer Sheremetev
SHCHE	S. O. Shcherbakov
SU	P. O. Sukhoi
TU	Andrei Nikolaevich Tupolev
VK	V. Ya. Klimov
YAK	Aleksandir Yakovlev

Although the new system of designation using designers' initials is now customary, the old system by general military operation has also been used in recent years. From 1925 to 1940, Soviet aircraft were named according to the general military operation for which they were designed. The first letters of the descriptive military operation were used as a prefix followed by a serial number. The following listing shows the old functional categories:

ARK	Arctic reconnaissance—Artícheski Razvedchik Korabelny
BB	Short range bomber—Blezhanaya Distantsia Bombadirovshchik
DB	Long range bomber—Dalny Distantsia Bombadirovshchik
DI	Two place fighter—Dvukhmestny Istrebitel
I	Single engine fighter—Istrebitel
KOR	Shipborne reconnaissance—Korabelny Razvedchik
MBR	Short range coastal reconnaissance—Morskoy Blezhanaya Distantsia Razvedchik
MDR	Long range coastal reconn.—Morskoy Dalny Distantsia Razvedchik
MI	Seaplane fighter—Morskoy Istrebitel
MR	Seaplane reconnaissance—Morskoy Razvedchik
MT	Mining and torpedo—Minirovanie Torpedonosets
PS	Transport—Perevozochony Samolet
R	Reconnaissance—Razvedchik
SCH	Low level attack—Shturmovik
SB	Light fast bomber—Skorostnoy Bombadirovshchik
TB	Heavy bomber—Tyazhely Bombadirovshchik
U	Primary trainer—Uchebny Samolet
UT	Advanced trainer—Uchebno-Trenirovochny
UTI	Uchebno-Trenirovochny Istrebitel

Before 1940, most Soviet aircraft engines were built under license from foreign designs and were designated by a serial number prefixed by the letter "M" for "Motor." Later engine designs have been given the designer's initials for the prefix, as in the case of aircraft, but there appears to be no definite system.

Shoopie's Sabre Swingers

(Continued from page 23)

146th has its share of battle aces too. One of the old hands in the 196th Squadron, which is based in Ontario outside Los Angeles, is Major Bob Love, who was a six-Mig ace in Korea, and who represented the 146th in the 1954 and 1955 Ricks Memorial Trophy Races from Ontario to Detroit. Like his boss, Shoop, Bob Love on week days is a test pilot for Northrop. Love flew 57 combat missions in Korea and was the first Air Guard ace in that conflict.

Lt. Col. Don Bochkay, who commands the 115th squadron at Van Nuys, served with the 357th Fighter Group in the European Theater of Operations where, in two tours of duty, he flew 123 missions and logged 510 hours of combat flying. He destroyed 16 German aircraft, the last two being jets which he shot down while flying an F-51.

Maj. Cliff Jolly, executive officer of the 196th, was, with Bob Love, one of the three Air Guard jet aces to come out of the Korean hassle. He destroyed seven Mig-15's, damaged three others, and was credited with one more "probable". In civilian life he is also a test pilot for Northrop.

Capt. William Lear, of the 115th, gained national recognition at the tender age of 16 as an acrobatic pilot in his own P-38. A two-time entrant in the Bendix Air Races before he was 18, he later served as an F-84 pilot in Germany. At present he is a flight commander and one of the wing's hottest instrument pilots.

One of the Arizona squadron's top

(Continued on page 56)

New beauty...New safety...New cabin quietness!

Outstanding among the many new features of the 1955 Cessna 180 is a new "hushed" cabin . . . engineered to give you almost unbelievable quietness in flight.

Over-150-mph speed—outstanding luxury, stability, ease of handling—you get all that in the Cessna 180 . . . and now a great new advantage has been added! Cabin quietness so complete you have to experience it to believe it—made possible by an improved engine that delivers the same horsepower at fewer RPM's—relocated ventilator intakes—and a new ¼-inch thick windshield. Yet you get all this at the same low price of $12,950 f.o.b. Wichita. Ask your Cessna dealer to demonstrate or write CESSNA AIRCRAFT CO., Dept. F-X, Wichita, Kansas.

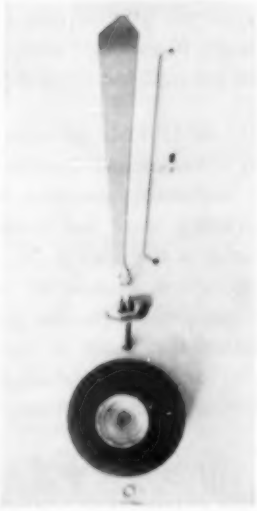
Cessna

Short Fields Solved!

Long, wide "Para-Lift" flaps give your Cessna 180 easy access to the smallest landing areas, lowers the airplane at the speed of a descending parachute or sweeps you off of short runways in seconds! Easily operated through 3 positive positions by a seat-side control. A safety "must" for high-altitude, short-field flying!

Simplest Landing Gear —Safer Still!

No complicated parts! Nothing to service. Always down and locked! And now the spring steel landing gear on the Cessna 180 has been moved 3 inches forward to make landings safer and easier than ever!



Room with a View!

Inside the "hushed" cabin you get your choice of fabric color combinations—soft, adjustable foam rubber seats—all-weather heating-ventilating system 6 vents and defroster. Luxury of the finest automobiles but *3 times the speed!* Behind the rear seat —120 lbs. of luggage—and you can reach it in flight!

CESSNA 170 180 195 310 THE COMPLETE AIR FLEET FOR EVERY BUSINESS NEED!

ONLY THOSE, WHO TRAIN **NOW,** WILL HOLD TOMORROW'S **IMPORTANT** JOBS IN AVIATION . . . . .

Many of today's leading aviation executives are SPARTAN graduates of a few years ago. The top men of tomorrow are in training today. There is a place for you in this great industry if you will study and train yourself for leadership.

SPARTAN can train you —as it has trained thousands— for important positions with interesting work and financial security as the reward. In only a minimum amount of time, you can prepare for that job in aviation that leads to success. Write for complete information today, without obligation.

SPARTAN
A UNIVERSITY OF AVIATION
SCHOOL OF AERONAUTICS COLLEGE OF ENGINEERING F-115
TULSA, OKLAHOMA

CAA and VA APPROVED

MARK AND MAIL NOW

Maxwell W. Balfour, Director
Spartan School of Aeronautics Dept. F-115
Tulsa, Oklahoma
Please send complete information immediately.
Name _____ Age _____
Address _____
City _____ State _____
Indicate which of these branches interests you:
☐ Aircraft and Engine Mechanics ☐ Flight Engineer
☐ Instrument Technician (Standard and Electrical) ☐ Link Trainer Instructor
Spartan is approved for training under the G. I. Bill of Rights

(Continued from page 54)

hands, Capt. William T. Kemp, is one of the few pilots who ever broke up an enemy attack single-handed while wounded and flying a crippled plane out of ammunition. He was flying fighter-cover for a group of bombers attacking targets in Germany. After the bombers dumped their loads, Kemp began strafing V-2 rocket launching sites. His airplane was hit and Kemp was wounded severely. With his plane limping badly, the ace became separated from his flight. A short time later, he saw enemy Me-109's attack a formation of bombers returning from a mission. The bomber pilots later estimated the enemy force at 50. Kemp started

The California Air National Guard flew these old Douglas O-38's in the 30's.

milling among the Germans, even though his guns were empty.

"I got behind a 109 and started following him, and suddenly he burst into flames. I knew it wasn't my ammunition that got him," Kemp says, "because I didn't have any. Apparently when the enemy saw the plane go down, they thought they were under attack by a number of F-51's instead of just one, and took off."

The top *"Sabre*-Swinger" of the 146th, "Shoopie" is a pilot's pilot—an amiable man, lean and tanned, with the silver hair that makes the Hollywood concept of the busy 20th century executive. As a pilot, he "stays loose," and as a commander, he keeps his outfit *"Sabre*-Sharp" with a light touch. His photogenic smile has prompted many invitations to play in TV and movies opposite his wife, Julie Bishop, star of Robert Cummings' Beanblossom TV series.

General Shoop enlisted in the Pennsylvania National Guard Infantry in 1927, and has progressed through the grades from private to his present rank. Learning to fly in 1930 as a cadet at March Field, he joined the California Air National Guard in 1933 and spent six years on active duty with the Air Corps during the second World War. Just prior to Pearl Harbor, he was an Air Corps representative at Douglas, and later transferred to Lockheed where he was assigned to experimental flying on the then new P-38. Later still he became one of the first test-pilots to fly Lockheed's *Constellation*. After that he became a jet pioneer testing the Bell XP-59 *Aircomet*, the first U.S. jet to fly.

He flew the XP-80 and a number of other experimental planes in their initial phases during a total of 15 years of testing. His thick flight logs include entries for testing single engine and multi-engine conventional fighters, two and four-engine bombers, two and four-engine transports, and single and multi-engine jets, the latest being the YF-102-A delta-wing fighters (the F-102 has recently been adopted as the Air Defense Command's first-line fighter). He conducted the early phases of testing on the all-weather radar fire control system and on air-to-air firing of the *Falcon* missile.

General Shoop was overseas with the 8th Air Force serving with the 55th Fighter Group in the air war over Germany. He took command of the 7th Photo Reconnaissance Group on June 5th, 1944, the day before the invasion of Europe. During that period his outfit was considered one of the top ranking Photo-Recon Groups and was credited by General Eisenhower with furnishing him with his most valuable information on the progress of the invasion in its earliest and most decisive stages. As a consequence, Shoop received his promotion to full Colonel.

The then Colonel Shoop met Miss Bishop during World War II and they were married when Shoop returned for a short period in 1944 to Air Force Headquarters following the European invasion.

At the end of the war, he returned to the United States and was assigned to command Muroc Flight Test Base. Having done extensive motion picture work both as pilot and technical advisor, Shoop appeared in or was an advisor on the mo-

General Shoop gets a smiling send-off from his wife and children.

tion pictures; "So Proudly We Hail", "Blaze of Noon", "Gallant Journey", "Saigon", "One Minute to Zero", "Jet Pilot" and others. At present he is a principal executive of the Hughes Aircraft Company serving as director of aircraft operations and flight test, as well as chief pilot. Scant wonder then that Shoop's 146th, which guards the Southern California wonderland, is no ordinary outfit, as it could hardly be with its galaxy of aces and its great leader. END

The U.S. AIR FORCE

offers you 4 great chances to get ahead . . .

The Warrant Officer Program helps you advance your career. Learn a good paying skill in a position with responsibility.

Aviation Cadet Training for men who want to win their wings as Pilots or Observers.

Officer Candidate School. Opportunity yours, if you "fill the bill". Graduate as a Commissioned Air Force Officer.

The Air Force Academy provides hard professional core of future top officers for the United States Air Force.

Yes, there's Opportunities Unlimited in the Air Force today! The skills you learn as an Airman will help you up the ladder of success. Get started on this rewarding, exciting career with a guaranteed annual income. The chances of advancement and technical training in the Air Force make it the career for you. Mail the coupon, or see your local recruiter, today!

F-20-F2

Airman Information Branch
Box 2202, Wright-Patterson AFB
Ohio

Please send me more information on my opportunity as an Airman in the U.S. Air Force.

name_____ age____

address_____

city_____ zone____ state_____

YOU GO PLACES FASTER IN THE U.S. AIR FORCE

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun.

Headquarters address is Box 5960 Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

AIRPORT AID

Cyril C. Thompson's recent appointment as airport consultant to AOPA holds promise of possibly even more service to pilots and owners of private planes in view of the newly passed Airport Aid Bill which provides $231,500,000 for public airport improvement and construction.

Mr. Thompson, widely known expert on airports and airport problems, will help formulate AOPA's long range policy in connection with the Government's public airport programs, as well as handle those individual airport problems of members needing specific attention.

The great majority of airport funds in the past have, as we all know too well, been channeled to the handful of giant metropolitan airline terminals while the needs of non-scheduled itinerant pilots have been virtually ignored. Overall planning that would include possible servicing of average communities with a network of inexpensive all-weather strips has been practically non-existent.

Yet, the increasing use of aircraft in business, for instance, has been described, since 1953, as a boom. Supposedly 24,290 planes are being used this year for business purposes. The CAA reports that company-owned planes used for business and industrial flying total 10,550. One of the big reasons for the increase is industry's shift to decentralization. New plants and new customers are appearing in new places—for which the established routes and schedules of the commoner carriers are presumably inadequate. Companies that are sold on business flying say that they can't measure in dollar values the advantages of speed, efficiency, convenience.

The more small plane use, the greater the need for numerous, small landing places. It is AOPA's hope that a just share of the newly available public funds will be used to equalize the existing situation through the allocation of a proper share for the construction of small, all-weather flying fields, a necessity if private flying is to begin to fulfill its vast potential. AOPA'ers are urged to call on Mr. Thompson for help, should they need it, as they bring the attention of their local officials to their own communities' airport needs.

FINANCING SAFETY

Over $1,000 has flowed into the AOPA Foundation — earmarked for scientific aviation research to make flying safer—through AOPA's six-months-old magazine subscription service.

The AOPA Foundation, Inc., though it is of eventual service to AOPA members, is a separate corporation, for those who don't already know, devoted solely to research for the development and betterment of the personal type aircraft and for ensuring greater pilot safety.

Among the Foundation's completed projects are: 1. the 180° Rating course, developed by the University of Illinois, and acknowledged by all authorities to be a real life saver, 2. the safety film, "Flight Decision", on the subject of pilots and bad flying weather (it's a 16 mm sound film available for loan from AOPA or NASAO), 3. a Crash Injury Study, in cooperation with Cornell University and the Guggenheim Foundation. Targets for the future are innumerable and of as immeasurable value.

The Foundation is financed by 30c allocated from each AOPA member's dues, as well as by contributions (which, of course, are tax deductible). But it well looks as though the magazine subscription service could produce the steady year in and year out revenue that will sustain the Foundation research and push it ahead, and that is also a service to the individual subscriber in an immediate sense. Here's how it works. When your magazine subscriptions need renewing, or when you decide to subscribe to a new one, you can get the magazines through AOPA at regular subscription rates or at publishers' discount rates if they've been offered you. AOPA obtains the magazines for you through an agency arrangement, allowing a percentage of each subscription to go directly into the treasury of the AOPA Foundation, Inc.

Over 700 AOPA'ers have already availed themselves of the plan (and some are so enthusiastic, they've written us, that they've circulated it around their offices and plants). Members desiring to use the service are asked to write AOPA National Headquarters, Box 5960, Washington 14, D. C., for subscription price listings or to send their subscriptions direct to AOPA when they are due for renewal.

NEW SERVICE IN MAKING

AOPA is now in the process of picking up the data that will inaugurate a new AOPA service, a notification of the need for the renewal of medical certificates 30 days prior to the expiration date. It has been compared in importance to the AOPA service notifying all aircraft owners of CAA Airworthiness Directives.

The medical notification service will not be restricted to AOPA members but will be for all pilots, another public service of AOPA in the interest of flying safety. The data is coming in at the rate of 4,000 reports a month. In two years' time it should be complete for all pilots currently flying.

One of the benefits, of course, is that the reminder will help protect a pilot's insurance coverage, since most accident policies are void if an accident occurs when the pilot is flying illegally (and it is illegal to fly without a currently valid medical certificate).

AOPA AIR-CHARGE HITTING STRIDE

AOPA Air-Charge is a success. We were convinced it would be or we would not have spent the two years of negotiation it took to get the system into operation. Over 300 fixed-base airport operators signed up to participate in the service within three weeks after the service was announced, and not a day goes by that doesn't see more climb on the bandwagon. Five hundred thirty operators now offer this "charge it" service to AOPA pilots. Eighty-seven operators reported substantial increase in business resulting from the AOPA Air-Charge card in just the first 20 days that the plan was in operation.

The AOPA Air-Charge card can be used throughout the country for the purchase of gasoline, oil, accessories, parts, services, repairs, with one consolidated billing at the end of the month, thus making air travel easier and faster, and accounting and expense recording tasks simpler. AOPA's 46,000 members have by now all received their current cards (green and valid for the period Oct. 1, 1955 through March 31, 1956) which replaces the orange and black card which expired Sept. 30.

"I'd sure like to get my hands on the guy who simplified the airplane!"

Modern Aviation Insurance

Tailor-made for private and company-owned aircraft

North America keeps abreast of aviation with coverages modern as tomorrow's planes.

Whatever your needs, North America will fit its policies to them. This means you can have your protection tailor-made to private or company-owned aircraft. With this coverage goes North America's fast, professional service that is based on the experience and know-how of our Aviation Department.

No matter how specialized or unusual your requirements, you will get the most complete service from North America. Call our Agent, or your own broker, about this modern coverage and service.

NORTH AMERICA COMPANIES

Insurance Company of North America
Indemnity Insurance Company of North America
Philadelphia Fire and Marine Insurance Company

PROTECT WHAT YOU HAVE© **Philadelphia 1, Pa.**

Become a Flight Officer with United Air Lines

New booklet tells you how

United Air Lines—the nation's fastest growing airline—offers unusual career opportunities for Flight Officers.

To qualify, you must have a commercial pilot's license with 165 hours or more (no multi-engine time required); be a U. S. citizen and a high school graduate between the ages of 21 and 28; between 5'7" and 6'4" in height; and able to pass a flight physical without waivers. Applicants with C.A.A. instrument rating or flight engineer examination written portion passed will be accepted through age 29; with both, through 30. Successful applicants attend United's Flight Training Center at Denver and receive pay while training.

Excellent pay . . . you get $465 a month on assignment to line, and from then on, your pay increases at regular intervals.

United Air Lines offers security, too, as well as good pay and rapid advancement. You enjoy a broad insurance program, retirement income plan and many other generous benefits.

To get a booklet giving you all the details about your career opportunities with United Air Lines, simply fill in the coupon and mail. Remember, even if you are not immediately available, United's continuing growth will maintain the need for qualified men for years to come. Get the booklet and plan your future now!

C. M. Urbach, Supt. of Placement
UNITED AIR LINES
Operating Base, Dept. Fly-11
Stapleton Airfield, Denver, Colorado

Please send me your booklet that tells me how I can become a Flight Officer with United Air Lines.

Name _____

Address _____

City _____ Zone ___ State _____

COMPUTERS—SEXTANTS

E-6B COMPUTERS, (Dalton) ($10.00 value), with 30 page illustrated direction manual: like new $4.40, with leather case $4.90, new $6.50. model G knee type, new $4.75. SEXTANTS, bubble averaging with case ($300.00 value) like new, Fairchild or Link $16.85.

KANE AERO EQUIPMENT CO.
2308 N. E. 23rd St. Oklahoma City, Okla.

BUSINESS BRANDS

THE LARGE RMC on the side of this orange and white Bell 47H-1 helicopter is the brand of Radio Materials Corporation, an electronic components manufacturer, which uses the craft for executive transportation between its plants at Chicago and Attica, Ind. Joseph F. Riley, chairman of the board for RMC (right above), estimates the copter will save more than 800 executive hours. George C. Snyder of Chicago's Seaplane Base (left) is the company helicopter pilot, although both board chairman Riley and RMC president Richard Bourgerie are licensed pilots.

When Your Engine Quits at Midnight

(Continued from page 26)

turn, let's get our finger on the number one individual flare switch. Now we're headed into the wind, wings level, 2,000 above ground and we've completed Phase I. Whether we're in position or not, we must proceed to Phase II.

Phase II—*Specific Field Selection and Positioning.*

A flip of the flare switch and "Wham" off goes flare number one. We feel a slight tremor in the airplane structure as the flare was ejected from the projector tube, and a small stream of fire indicating the projectile path is visible to the left of the airplane. A subdued "pop!" is immediately followed by the brilliant white light of the burning flare candle. There is no time to stare at the burning flare, although this is a definite temptation.

We must start an immediate left turn to stay within the flare's cone of illumination. Our best position for viewing objects on the ground is below the flare's level, but we can allow our airplane's faster rate of descent to solve this problem for us. We have approximately one minute, or 800 feet, to select our specific field for the forced landing and to maneuver to the extreme upwind end of it. You should avoid looking directly into the flare for, although it won't completely blind you, it will reduce your night adaptation. Major ground details are visible for a distance of approximately one mile in every direction from the flare's position. The field selection search should favor the downwind area because of flare drift. You will note that lighter ground colors stand out more prominently than dark colors and a little knowledge of seasonal field colors will pay a big dividend.

Ah! There's a good field. It's easy to spot as a field in which a crop has been grown during the summer and we're thankful there's enough light-colored stubble remaining to make it stand out in the flare illumination. This field, selected during the first 180-degree of turn, is now to the rear of our left wing and it's apparent that the completion of a 360-degree turn will put us directly over it. We must reach the extreme upwind end before reaching 1,200 feet above ground. Where's that second flare switch? Ready or not, 1,200 actual is the end of Phase II and we must proceed to Phase III.

Phase III—*Approach and Landing.*

Wham! and away goes flare number two. One second later, our field is lighted up like Comiskey Park for the night portion of a double-header. Our upwind position headed directly into the wind points to an elongated 360-degree overhead approach to a landing, so we start a left turn immediately upon firing the flare. During the initial stages of our 135-degree left turn we allow the airplane to dive

(Continued on page 62)

in the palm of your hand

HIGH PAY SECURITY ADVANCEMENT

yours with

Embry-Riddle

training

Your future is in Aviation. You can move ahead fast and have real security...when you have the benefit of Embry-Riddle training.

The Aviation industry is literally bursting with opportunities for eager young men—*with guided specialized technical training.* Today, it's America's largest employer. In addition to commercial airlines, there are 22,000 airplanes owned by business firms. And there are hundreds of men in Aviation for every pilot in the air!

Embry-Riddle International School of Aviation will prepare you professionally for your choice of many career opportunities. Embry-Riddle's Placement Service and an alumni of over 50,000 men will open doors to a quick start in a well-paying job.

Practical, easy-to-grasp *accelerated one-year courses eliminate non-essential study.* Also 2-year and 4-year (BBA degree) courses in cooperation with the University of Miami. Modern equipment . . . live aircraft. All training under personal supervision of a faculty of specialists.

Study and play in Miami's perfect year-round climate is stimulating and exciting. You'll find new friends at *America's foremost aviation school.* So take your first step NOW. Check the courses that interest you and mail the coupon for full information.

MAIL THIS COUPON TODAY

DEAN OF ADMISSIONS, Dept. 94
Embry-Riddle School of Aviation
Miami 30, Florida

- ☐ Business-Pilot
- ☐ Aviation Administration
- ☐ Aero Engineering Design
- ☐ A & E Mechanic
- ☐ A & E combined with Private Pilot
- ☐ Private Pilot
- ☐ Commercial Pilot
- ☐ Instrument Rating
- ☐ A & E combined with Commercial Pilot
- ☐ Electronics

Without obligation, please send FREE and postpaid, full particulars about courses checked.

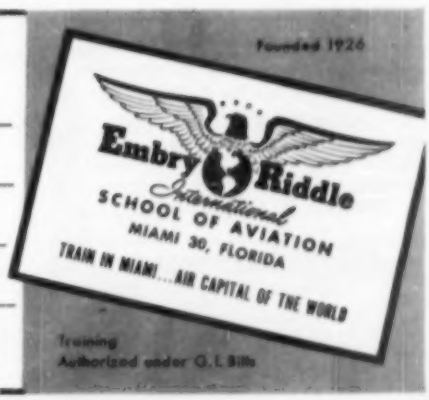
Print Name

Address

City

State *Age*

I am a (check one) ☐ *veteran* ☐ *non-veteran*



YOU ARE TOPS IN AVIATION WHEN YOU BECOME A PARKSMAN!

YOU, as a Parks graduate, will benefit from the world-wide reputation of Parks and Parksmen as leaders in aviation!

YOU will find that your education has been so thorough . . . so complete . . . that you will be able to advance rapidly to positions of responsibility!

YOU will have earned a Bachelor of Science degree from Saint Louis University in THREE years instead of four . . . allowing you to begin your career one year earlier!

YOU WILL KNOW that no other man is better prepared to advance faster, earn more in less time . . . in America's largest industry — aviation! Find out today how YOU may become a Parksman!

You may earn a B.S. degree in Aeronautics in:

Aeronautical Engineering
Maintenance Engineering
Aeronautical Administration

(Air Force ROTC allows you to complete your education without interruption.)

Non-degree courses available — CAA Approved, A & E Mechanics — 45 weeks covering all phases aircraft and engines.

Flight courses — Private, Commercial, Instrument, Instructor and Multi-engine Ratings.

All Parks Schooling Approved for Veterans

Next enrollment date:
January 3, 1956

PARKS COLLEGE, HARPER HALL
East St. Louis, Ill.
I am interested in:
- ☐ Aeronautical Administration
- ☐ Aeronautical Engineering
- ☐ Aircraft Maintenance Engineering
- ☐ Aeronautical Meteorology
- ☐ Flight Courses
- ☐ A & E Course
- ☐ Information on Public Law 550

Name.....Age.....
Address.....Zone.....
City.....State.....

PARKS COLLEGE
OF SAINT LOUIS UNIVERSITY
HARPER HALL • EAST ST. LOUIS, ILL.

WANTED
Clean, used aircraft in all categories.
We buy for CASH.
GRAUBART AVIATION
Tel. Mohawk 4-7190
677 N. Michigan Ave. Chicago, Illinois

AIRPLANES WANTED
Need 50 Bonanzas, 195's, 190's, 180's, 170's, Tri-Pacers, Twin Navions, Aero Commanders, Twin Bonanzas, etc.
Pay Highest Wholesale Prices—We'll Buy One or Complete Dealers' Stocks, New or Used.
VEST AIRCRAFT CO.'S SKYRANCH
BOX 5306, DENVER 17, COLO.

(Continued from page 60)

for approximately 200 feet. This not only serves to put us immediately below the flare for best ground visibility but increases our rate of descent to allow us to touchdown before the flare extinguishes in 1½ minutes.

At 900 actual we're headed straight-away on our outbound diagonal and must now make a final decision on gear position for the landing. This important decision was reserved for the final phase where ground illumination is at a maximum. The slightest element of doubt about field suitability calls for a gear-up landing because the comparative cost of repairing belly damage sustained gear-up is normally no more than that of replacing landing gear wiped off on a rough field. Personal safety is really the prime factor. Given a rough field, the chances of walking away from a landing are immeasurably better with gear up. When in doubt, leave that gear up. Midwestern prairie, with an ample supply of quarter and half-mile fields, offers plenty of exceptions to this rule for the lightplane pilot.

It's quite obvious, with flare illumination, that our selected field is a firm, relatively smooth, quarter-mile field and we decide to land gear-down. We'll wait for the turn from base to final for actually lowering the gear just in case we're a bit short. Turning base close-in, we note that we've almost 500 feet and now our attention is devoted to judging altitude and distance in terms of glide angle.

On base leg both landing lights are turned on just in case the flare extinguishes before touchdown, and we hit the gear switch at 250 feet turning onto final. We're conscious of the flare at 500-600 feet above and ahead, as we roll out on final approach. Let's use full flap now. A quick check indicates gear "down" as

Table No. 1—RECOMMENDATIONS BASED ON FOURTEEN SIMULATED NIGHT FORCED LANDINGS USING SPECIFIC AIRPLANES AND SPECIFIC FLARES

FLARE TYPE	CLASS 2 1½-MINUTE ELECTRICAL	CLASS 3, 1-MINUTE PISTOL FLARE			
Airplane Type	Bonanza C-35	Piper Tripacer	Cessna 170	Cessna 140	Stinson 150
Power setting used	Idling	Idling	Idling	Idling	Idling
Indicated Airspeed mph	95	80	80	70	85
Passenger load including pilot	4	4	4	2	4
Landing Gear	Lower on base or final as necessary	Down	Down	Down	Down
Flaps	Lower on base or final as necessary	Lower on base or final as necessary	Lower on base or final as necessary	Lower on base or final as necessary	Lower on base or final as necessary
Airplane's average rate of descent in feet per minute	740	870	670	640	860
Altitude above ground to release flare for field selection purposes	2000	1800	1600	1500	1800
Average time from release of first flare to altitude for second flare. In seconds.	67	55	57	59	55
Altitude above ground to release second flare for landing purposes	1200	1000	1000	1000	1000
Position of airplane relative to selected field for release of second flare	Extreme upwind	Extreme upwind	Extreme upwind	Extreme upwind	Extreme upwind
Recommended approach pattern from second flare to landing. Overhead approach.	180 or 360 degree	180 or 360 degree	180 or 360 degree	180 or 360 degree	180 or 360 degree
Desirable airplane position in relation to flare to obtain best visibility.	Below	Below	Below	Below	Below
Time from second flare to extinguishment. Minutes.	1½	1	1	1	1
Excess altitude necessary to dive off immediately following release of second flare to land before flare extinguished	200 ft.	100 ft.	400 ft.	400 ft.	150 ft.

we skim over the fence and begin our round-out for the landing. Easy here—there's a tendency to level off high under flare light. Let's be ready to hit the brake immediately upon contact with the ground. Whoa, airplane! We come to a halt, almost a third of our field remaining, just as our flare extinguishes directly over the downwind end of the field.

If you're equipped with the one-minute pistol flare, the procedure is basically the same. The firing altitudes are lower due to reduced candle-power. The phase II flare should be fired at 1,500-1,800 feet and the phase III at 1,000. You'll find your total task is more complicated handling

Table No. 2—FLARE DATA AND PERFORMANCE CHARACTERISTICS

SOURCE	DATA OR CHARACTERISTIC	CLASS 3 1-MINUTE PISTOL	CLASS 2 1½-MINUTE ELECTRICAL
CAA	Minimum allowable burning time in minutes. CAA TSO-C24 dated 10/10/50.	1	1½
CAA	Minimum allowable Light Intensity in candle-power. CAA TSO-C24.	70,000	110,000
CAA	Maximum allowable rate of descent in feet per minute. CAA TSO-C24	550	550
CAA	Minimum number of flares required by C.A.R. Parts 42 and 43 for irregular or non-scheduled commercial night operation beyond 3-mile radius of airport.	5	3
CAA	Maximum number of years recommended prior to factory renovation of flare unit. Aviation Safety Release No. 321, dated 7/1/49.	3	3
Mfg.	Approximate retail cost per flare unit.	$21	$35
Mfg.	Weight in pounds and ounces per flare unit.	1 lb. 14 oz.	4 lb. 5 oz.
Mfg.	Momentary recoil in pounds.	100	150
Mfg.	Horizontal distance in feet flare is projected upon firing.	67-82	67-82
Mfg.	Parachute diameter in inches.	48	60
Mfg.	Safety device to prevent accidental firing of flare unit.	Safety catch on pistol	Double switch arrangement
Mfg.	Safety device to prevent flare from igniting before leaving airplane	Same as center fire shotgun shell	Interrupter fuse
Mfg.	Minimum release altitude in feet to insure flare extinguishment before striking ground.	800	1,000
U of I	Recommended angle of fire	As nearly horizontal as possible	Horizontal
U of I	Recommended maximum release altitude for minimum usable illumination of ground objects. (Actual altitude in feet)	1,800	2,300
U of I	Recommended Maximum release altitude (in feet) for minimum usable AREA of illumination at time of flare extinguishment.	1,000	1,200
U of I	Desirable minimum altitude of flare to obtain minimum AREA of illumination for landing touchdown.	400-500	400-500
U of I	Radius in miles of usable ground illumination at maximum recommended release altitude.	½-¾	¾-1
U of I	Maximum drift distance in miles of flare from release to extinguishment in 30 mph wind.	½	¾
U of I	Functional reliability of flares over 3 years but less than 5 years of age.	92%	92%
U of I	Functional reliability of flares over 2 years of age but less than 3 years.	100%	92%
U of I	Functional reliability of flares less than 2 years of age.	100%	100%
U of I	Recommended airplane position in relation to flare for optimum vision of ground objects.	Below	Below

HERE'S NEWS!

ASL Price Reduction

the AUTOMATIC STATION LOCATOR

A direction finder custom tailored for your low frequency receiver. Weight 3 Lbs., 15 Oz. Current drain .2 AMP.

GIVES YOU A
Navigation System on Standard Broadcast Stations.

Public acceptance and improved production methods make possible a savings which we are pleased to pass along to you, our customer.

NEW PRICE, effective Oct. 1, '55 — $159.00

Complete installation kit is furnished at the above price, and includes the following:

- ★ ASL Ferrite Loop.
- ★ Main Unit, Meter and all Cables and Harness ready for plug-in installation.
- ★ Antenna insulators
- ★ Radio Modification Kit
- ★ Complete installation and Radio Modification instructions.
- ★ ASL Operation Handbook.
- ★ Booklet on Radion Tracking Procedures.

NOTE: The ASL adapter program is for the following receivers only:

ALL GE series AS-1, 2 & 3
Bendix PATR-10 & PAR 70A
Narco VTLR-2 & LFR series 1, 2 & 3
Motorola and Hallicrafter

For steel-tube, fabric-covered airframe, use built-in three wire loop. The ASL price, complete but without loop, is $149.00

Please do not place order if your receiver is not in good condition and properly installed.

When ordering, please specify type of aircraft and type and model of receiver.

AIRCRAFT SPECIALTY LINES
10200 N. 19TH AVE.
PHOENIX, ARIZONA

two can do it better...

and so can dual omni!

Two on the job make any mission *twice* as easy . . . just as dual ARC Omni installations double efficiency, ease and confidence in navigation. With dual omni 15D equipment, a single pilot can make a fix *faster* . . . he can fly any omni track while also cross-checking for position. It's easier to make transition from omni to runway localizers.

With two pilots, the work can be shared for greater ease, by using both omni instruments simultaneously for different jobs.

ARC 15D Omni is compact, lightweight, CAA certified, and now employs new course indicator which combines course selector and cross-pointer meter in a single space-saving unit.

Lighten the load with ARC DUAL omni. Specification data sent on request.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation

BOONTON, NEW JERSEY

Omni Receivers • UHF and VHF Receivers and Transmitters • LF Receivers and Loop Direction Finders • 10-Channel Isolation Amplifiers • 8-Watt Audio Amplifiers • 900-2100 Mc Signal Generators

BATORI COMPUTERS

With the New 66-Page Instruction Booklet

Gives more information than any other computer. Only one moving part on each face; one hand operated; one setting in most cases. All metal precision instrument. Sharply defined penetrated scales, easy to read. Accurate true air speed with allowance for compressibility and compressibility heating. Solves all wind problems, drift, heading, etc., without need to depict triangles, using pencil and eraser, or manipulate graphs. Radius of action, critical point, point of no return, off-course correction to avoid danger areas, pressure pattern navigation. Mach number. All precision machine turned. Will not stick or slip. Will not warp or crack. Any climate. Lasts indefinitely. Thousands sold.

B-23 Pocket Size 4⅝" diameter $15.00
B-24 Shirt Pocket Size 3" diameter 12.00
B-26 and B-36 Jet Computers 4" diameter ... 20.00

All with carrying case and instruction booklet, a complete novice can use it.

BATORI-ANDERSON PLOTTER

For all chart work. Arrow indicates direction unmistakably. Corrects off-course heading. Crystal clear transparent. Sharply engraved scales. Easy to read. Available with scales in Nautical or Statute Miles.

With illustrated leaflet $5.00

BATORI MARK II PLOTTER, Pocket Size

Scales in Nautical Miles, crystal clear transparent, sharply engraved scales

With illustrated leaflet $2.50

BATORI COMPUTER COMPANY, INC.

551 Fifth Avenue New York, New York

NEW Exide BATTERIES

12-Volt—$16.50 Each

In original factory cartons. Fully guaranteed. 26½ lbs. filled. 6½"x5¼"x8½" high. Suitable for all light aircraft including Cessna 140, 120, Supercruiser, Ercoupe, Swift, Culver, Stinson, Luscombe 8E and others.

GAARE SUPPLY CO.

Gaare Airport Box 277-E Weatherford, Texas

ENGINEERING DEGREE IN 27 MONTHS

INDIANA TECHNICAL COLLEGE

U.S. DEGREE. Aeronautical Chemical, Civil, Electrical, Mechanical and Electronic Engineering (inc. Radio and TV). Drafting. 1-yr. Gov't approved for G.I.'s. Low rate. Earn board. Large industrial center. Students from 48 states, 21 countries. Demand for graduates. Enter Dec., March, June, Sept. Catalog. 9-1211 E. Washington Blvd., Fort Wayne 2, Ind.

(Continued from page 63)

the pistol, and the timing is more critical because the flare burns for only one minute. We elected to fire the pistol left-handed because this permitted a straight arm firing from the left window. The window itself may require a minor modification to permit this. In the *Tri-Pacer*, for example, we replaced the window hinge pin with a removable pin which allowed the window to open entirely. This modification requires about 30 minutes and costs 15 cents.

The entire procedure is based on the use of two flares for very good reasons. You simply don't have time to fire more than two, or three at best, pistol flares in the time available. With the electrical flares in racks of three the third flare is saved for possible misfire of one of the two planned. In firing 40 flares, we had only three misfires. Two of these were beyond the three-year recommended renovation period and the third was due to a dent in the projector tube which probably occurred during installation. Incidentally, in this particular case, the effectiveness of the safety device on the electrical flare was definitely proven. The pilot was completely unaware that the projectile had lodged half in and half out of the projector tube; the parachute opened and was dragged from 1,200 feet to the ground stringing out behind the airplane. These flares cannot ignite unless and until they have completely expelled from the projector tube in the airplane.

Personal confidence in this emergency procedure will only come through serious practice. Every one of the 13 pilots who participated in this project would unhesitatingly say, terrain provided, they feel confident they could walk away from a night forced landing. You can acquire this confidence by practicing the procedures. Preliminary practice can be done in daylight hours with a pilot friend who starts a stopwatch or photographic timer when you call "bang" at the flare firing point. He can tell you, or allow the timer bell to warn you, when the flare theoretically extinguishes. You will undoubtedly want to make two or three "dry runs" at night once you have the timing perfected. If you have any flares over three years old and thus due for renovation, you'll find it relatively inexpensive to use them for a simulated night forced landing over your home airport. In this case, you'll want to enlist the cooperation of your local airport manager and provide adequate fire protection on the ground for potential misfires. We had only one of 40 flares fired which failed to extinguish before striking the ground and the men in our fire truck smothered it almost immediately with two buckets of sand. This particular flare, over three years old, failed to expel properly from the projectile case and fell to earth after igniting.

The complete results of our project are available free of charge in bulletin form. You can obtain a copy by writing to the International Flare-Signal Division, Kilgore, Inc., Westerville, Ohio. This information and some serious practice on your part can put potential night forced landings in the same mental category as similar daytime emergencies. END

MAILBOX

(Continued from page 6)

not far from my home. In addition to flying, I am interested in horse riding competition as I breed Anglo-Arabian horses with which I participate in shows. I appreciate other subjects too, as I completed a four year university course before starting as partner in ranching.

In my spare time I have flown over many parts of southwest Africa and also as a passenger over the whole length of Africa, Italy and most of Europe. But as you know, on such a big ranch as this the evenings are long and lonesome, the only connection being a strong radio. Consequently I would enjoy very much receiving letters from your readers which I will gladly answer.

A. K. HIPKIN

"Uitzoek," P.O. Box 20,
Cornelia, O.F.S., South Africa

GRAND ISLAND AIRPORT

I have thoroughly enjoyed Jack Sterling's "Hangar Flying" story of his experience at Grand Island, Neb. History repeats itself, I guess, for I had an almost identical experience at another spot where the Air Force field had been taken over as a municipal airport following

abandonment of the municipal field recorded on the map—teaching me to keep my maps up to date.

Just in case readers might think that Grand Island is still an abandoned airport, please let me advise that it is one of the busiest airports I have even seen for a town of Grand Island's thirty odd thousand population.

LOREN CARLBERG

Enid, Okla.

LIGHT PLANES DOWN UNDER

As a private pilot I find your magazine most interesting, particularly in view of the fact that American light aircraft, especially the Piper Cub and the Cessna are coming into prominence on the local scene. I am looking forward to many useful articles which I expect to find in FLYING during the coming year.

K. SMITH

Pukekohe, New Zealand

ANY HEATHS AVAILABLE?

Rereading the article by Don Naughton in the December, 1953 issue, stimulates me to write and ask if there are any Heath airplanes still available in this country. I would like to own one if possible and would appreciate any help you could give me along this line.

RICHARD GRIFFIN

3518 N.E. Stapleton Rd.,
Vancouver, Wash.

STAY IN THE GROOVE-

with ARC's NEW CD-1 Course Director

Now it's easy to keep a straight, true course wherever you fly...make sure ILS approaches, maintain OMNI tracks with certainty. ARC's new Course Director automatically directs the pilot to the correct headings required for effectively intercepting and making good a desired track. Heart of the system, the Compass Slaved Directional Gyro, gives constantly corrected directional information. The ARC Course Director system is accurate to one degree. Computer portion of the system combines directional and track information obtained from the Localizer/OMNI Receiver and makes computations to provide the pilot with correct heading to intercept and/or make good a desired track and compensates for cross-wind. It relieves the pilot of 90% of his mental effort, helps prevent missed ILS approaches, saves time, effort and fuel, contributes to greater safety. Ask your dealer for complete information.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation

BOONTON, NEW JERSEY

Omni Receivers • 900-2100 Mc Signal Generators • UHF and VHF Receivers and Transmitters • 8-Watt Audio Amplifiers • 10-Channel Isolation Amplifiers • LF Receivers and Loop Direction Finders

AIRPLANES WHOLESALE
SEND FOR FREE WEEKLY LISTS
PLANES SUPPLIED TO DEALERS ON LOW-COST FLOOR PLAN
WE'LL FINANCE YOUR SALES!
VEST AIRCRAFT CO'S. SKYRANCH
BOX 5306, DENVER 17, COLO.

60 POWER TELESCOPE $3.98
VARIABLE EYE-PIECE 20 X-40 X-60 X—BRASS BOUND
NEW! Three telescopes in one. 3 different magnifications, 20 power for ultra-bright images with 40 and 60 power for extra long range. Guarantee to bring distant objects, people, sports events, ships, moon, stars, etc. 60 times as close. Most powerful for anywhere near the money. 5 Sections. Closes to 1 ft. long. Contains 4 ground and polished lenses. Also used as a powerful compound microscope. Directions included. Mass production enables us to offer this instrument at amazing price of $3.98 complete, money back guarantee. We pay postage. Get yours NOW!
Criterion Co., 331 Church St., Hartford 1, Conn., Dept. FS-37

Which of these WEEMS navigation instruments and aids do you need?

Navigation "musts" for pilot and student alike include WEEMS MARK II PLOTTER—standard for years with air forces. Scale fits Sectional and World Air Charts. Statute miles. Only $2.00; NEW WEEMS MARK II-N PLOTTER—differs from Mark II Plotter in that distance scales give nautical miles on Sectional and World Air Charts. Only $2.50; DALTON E-6B COMPUTER—two sides. One for computations other for vector problems. Only $10.00; CASEY-MYERS COMPUTER . . . Simple-to-use speed-time computer. A brand new item. Ideal for light plane pilotage. Only $4.00. Free Weems Catalog describes these, as well as many other essential navigation aids and instruments including the latest navigation books. Also tells you about the WEEMS AIR NAVIGATION SCHOOL established since 1927. Send for free Catalog today—or see your Aviation Supply Dealer. Address Department 5

WEEMS SYSTEM OF NAVIGATION
ANNAPOLIS • MARYLAND

The Ideal Xmas Gift For Your Friends "On The Way Up"

This Christmas, give FLYING—the world's most widely read aviation magazine.

Written by Airmen for Airmen, FLYING is the perfect gift—easy to order . . . inexpensive . . . welcomed 12 times a year by everyone interested in the wonderful world of aviation.

Each issue features the latest developments in the fast-growing and dynamic field of aviation, loads of lively articles on flying "know how" and techniques, planes, supplies, aviation insurance, financing, radio equipment.

SPECIAL GIFT RATES . . .

1st 1-yr. Gift Subscription..... $4.00
2nd 1-yr. Gift Subscription..... 3.00
Each addtl. Gift Subscription..... 2.00

An attractive gift card will be mailed to your friends announcing your gift in time for Christmas.

Fill in and mail the convenient postpaid order envelope facing this page for your own and gift subscriptions. List additional gift orders on an extra sheet of paper.

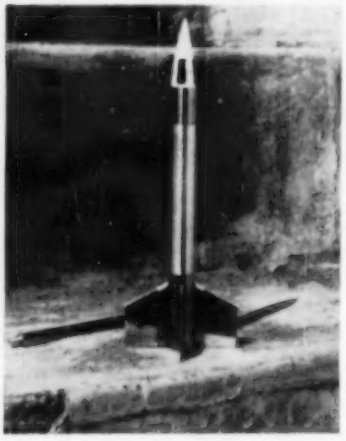
Your own new or renewal subscription may be included.

FLYING
MAGAZINE
366 Madison Avenue New York 17, N.Y.

MINIATURE MISSILES

CONTROLLED in flight by wires used to transmit control signals, the French Sfecmas 10 ground-to-ground and air-to-ground missile is receiving increasing interest from NATO officials. It consists of a streamlined main structure and four cruciform fins to give rotation movement and stability. The container, when unfolded, forms a launcher. Employed for a variety of missions, its operation does not require any special knowledge or training.

VESTPOCKET-SIZE, Japan's "Pencil" rocket is only slightly longer than an ordinary rocket. In tests this year it has blasted off at 382 mph. Prof. Hideo Itokawa, head of the Supersonic Aviation Engineering Institute on the outskirts of Tokyo, declared the tests have been "highly satisfactory." The "Pencil" is equipped with tiny fuel and engine compartments and four tail fins. It is 10 inches long. The miniature rockets were fired at sandbags to test both speed and stability. Itokawa said the small steel and aluminum rockets can be used at the geophysical observations in August, 1957.



Missile Report

(Continued from page 33)

such missile exists—the Boeing IM-99 *Bomarc*. An undisclosed number have been launched from Cape Canaveral. The missile ascends vertically, gaining speed rapidly from its rocket engine. Speed increases when two powerful ram-jets grab air and flame. The weapon promises tremendous improvement in target defense. Severe engineering requirements have delayed the program but major obstacles have been overcome.

The "main event" in missile development, of course, is the intercontinental vehicle which can range more than 5,000 miles to deliver nuclear warheads. USAF currently has in varying stages of development three such missiles, the Northrop SM-62 *Snark*, North American SM-64 and SM-64A *Navaho*, and the Convair SM-65 *Atlas*. The first two are cruise missiles and the latter a ballistic weapon.

The term "cruise missile" comes from the path flown by such vehicles as the much tested *Snark* and *Navaho*. The pilotless bombers fly with steadily-increasing speed and altitude as the missile loses the weight of burned fuel. Powerful rocket motors, either liquid or solid propellant, lift the missile until it is moving high and fast enough for its jet engines to sustain flight.

The most pressing strategic-range missile problem is accurate guidance. The SM-62 employs an inertial and celestial guidance system. A tracking telescope in the missile is aligned continually on two fixed stars by photoelectric cells. This controls the missile so that it follows an imaginary point on the earth's surface on a line from the center of the earth to the star (called the instantaneous sub-stellar point). The inertial system, a form of auto-pilot, keeps the missile on course when the celestial equipment has difficulty in following its fixed-star reference points; this may happen in turbulence which rocks the missile, or when the bird in early flight passes through heavy clouds.

The secret North American *Navaho* has sensational performance. Even its development status is highly classified. What can be revealed is that *Navaho* is a cruise missile with ramjet engines which give the weapon a speed "several times" that of sound. Its cruising altitude is expected to exceed 75,000 feet. The ramjet engines have been separately flown in a test vehicle at more than 90,000 feet and up to 2,000 mph. The aerodynamic problems inherent in a missile which can sustain highly-supersonic speed over intercontinental range are impressive indeed, but have been largely met with the X-10 research vehicle, a remote-controlled supersonic airplane of *Navaho's* configuration.

The X-10 has been flying since early 1954. Special guidance systems of the celestial and inertial type would seem best suited for *Navaho*. Its tremendous speed, cruise altitude, and supersonic dive make interception virtually impossible.

USAF and Convair have an intensive development program under way on the SM-65 *Atlas*. This Intercontinental Ballistic Missile (ICBM) is designed to exceed "9,000 mph" over a range of 5,000 miles. Beyond this, there is little official data concerning the giant rocket.

We do know that, despite incredible problems, ICBM development has reached the point where the missile is both feasible and imperative. Recent research advances in hypersonic flow, thermal shock, guidance to techniques, high-energy propellants, and extremely large rocket motors (exceeding 120,000 lbs. thrust) all bring the ICBM into near future reality. Again the greatest obstacle is guidance. The missile must be directed to fall within a ten-mile circle at a range of 5,000 miles. Opposing this exacting demand are certain unpleasant facts. We may not know exactly where a target lies in enemy territory, or be able to trust our maps of enemy geography which have in the past often proven inaccurate. Gravity and air currents are not constant at varying altitudes and over different parts of the earth. During climb and descent the ICBM will be subjected to crosswinds of varying and unpredictable intensities. Gyroscopic equipment is a bottleneck.

The ICBM requires fantastic peaks in rocket thrust, and vast quantities of fuel. Banks of motors are necessary. We can anticipate generally the flight path of an *Atlas*-type missile. Burning time of its rocket motors will be about 12 minutes. The rocket initially maneuvers into a precise flight angle to begin its unpowered ballistic trajectory. At its peak of powered flight, it is moving at speeds up to 12,000 mph. It reaches aloft 1,100 miles from earth. As it returns to the atmosphere, its great velocity causes the missile to be battered by shock waves and to heat up dangerously.

Some engineers contend that the only means of assuring ICBM accuracy is to control the missile during its descent through the atmosphere. This is a bold undertaking, for during its wild plunge, the missile builds up enough heat through skin friction to melt off the outer missile casing. However, proponents for last-moment target control have excellent grounds for argument. In addition to difficulties we have discussed, even a slight error during launch and climb can mean a wide miss after 5,000 miles of flight. A missile, which on its launching table is only fractions of an inch off dead-center, can mean a wasted shot. Further complicating guidance is the sticky problem of the earth's rotation. It never has been a predictable cycle (despite the astronomy books). It can change non-uniformly, playing havoc with accuracy. These are only some of the problems. The fact that priority development has been given to the ICBM, however, testifies to gratifying advances in research engineering. Just how long it will require for the ICBM to become a finished product is a closely-guarded secret. END

WINNING MOODBEAMS # 10

We hope all your football teams are winners this season. We know they WILL be if they produce like the manufacturing teams SAC supports as one of the industry's major distributors. You CAN'T lose with factory-new parts backed by flying's All-Time All-American performers!

And speaking of winning ways, how about Bubble-Bathing Sally Merrill (19, blue eyes, golden hair, 5'4", 115 lbs)?

Footballs courtesy Doak Walker Sport Center, Inc.

SAY YOU SAW IT IN FLYING

HOLLADAY AVIATION CORP.
Charlottesville-Albemarle Airport
SERVING CHARLOTTESVILLE, VIRGINIA
4700' PAVED RUNWAY
Gulf Products Steel Hangar
Motel Restaurant Rental Cars
For complete information
Box 21, Charlottesville, Virginia

EXECUTIVE TRANSPORT

FOR complete market reports of available Beech, Convair, Curtiss, Douglas, Grumman, Lockheed or other multi-engine aircraft, write or call William C. Wold Associates, 516—5th Ave., New York 36, N. Y., Telephone Murray Hill 7-2050.

Two 3000' turf landing strips. Lighted strip for night landing. Deluxe hotel rooms and cottages. Compass Room Restaurant and Bar, swimming pool. Season: Sept. 1 to June.

FLY IN!

Desert Air

HOTEL & COTTAGES
PALM DESERT AIRPARK
P. O. BOX 1270 • PALM SPRINGS
CALIFORNIA

For Reservations: Write or Phone:
PALM SPRINGS 8-4611

DRIVE IN!

PROVEN most accurate of all popular omnis by government test

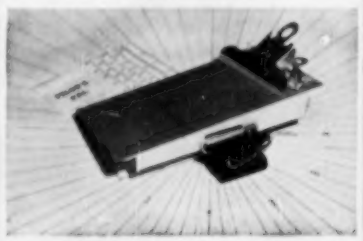
narco OMNIGATOR

AIDS YOU 6 WAYS
1 8-CHANNEL TRANSMITTER with powerful output and ample crystal capacity to cover all basic requirements.
2 75 MC MARKER BEACON RECEIVER
3 ILS LOCALIZER for instrument approaches.
4 VAR navigation
5 SUPER ACCURATE VOR navigation. Factory-calibrated and certified to be within ±2°—far exceeding IFR requirements. Large-scale course selector, separate left/right, to/from indicators for dependable, accurate omninavigation.
6 VHF RECEIVER for crystal-clear reception between 108-127 mc. High selectivity, thanks to 4-gang permeability tuner plus eight tuned IF circuits. Eliminates multiple-station interference.

SO LIGHT—SO COMPACT—OMNIGATOR mounts in standard glove compartment, weighs only 18 pounds complete with antenna, power supply. See your Narco dealer or write for brochure.

narco
NATIONAL AERONAUTICAL CORP.
AMBLER, PENNSYLVANIA

PILOT'S PAL
Registered Trademark



The All Aluminum 3-way Knee Board

The PILOT'S PAL is an all aluminum, three purpose item. Can be used as a knee pad holder, a desk pad, or separate clipboard. Belt is fully adjustable, heavy elastic. This unit will not slide out of place even while walking. One hundred percent satisfaction for this practical gift or your money back. $4.95 (Postpaid)

PILOT'S PAL
1422 Washington Street
Manitowoc, Wis.

YOUR COPIES OF
FLYING
ARE VALUABLE!

Keep Them Neat . . . Clean . . .
Ready for Instant Reference!

Now you can keep a year's copies of FLYING in a rich-looking leatherette file that makes it easy to locate any issue for ready reference. Specially designed for FLYING, this handy file—with its distinctive, washable blue Kivar cover and 16-carat gold leaf lettering—not only looks good but keeps every issue neat, clean and orderly.

So don't risk tearing and soiling your copies of FLYING—always a ready source of valuable information. Order several of these FLYING volume files today. They are $2.50 each, postpaid—3 for $7.00, or 6 for $13.00. Satisfaction guaranteed, or your money back. Order direct from:

JESSE JONES BOX CORP., DEPT. F
Box 5120
Philadelphia 41, Pa.
(Established 1843)

When is a tiedown?

(Continued from page 37)

one Cessna wing. The constant gusts caused the plane next to it to shift, allowing the wings of the two planes to rub. We caught it before the damage got serious.

Who paid us? Nobody; we didn't even know to whom most of the planes belonged and never saw their owners afterward. That makes little or no difference in the grand state of Montana, where old man big wind is everybody's problem. If we hadn't kept a check on the tie-downs throughout the storm, cat-napping on the ready-room floor, very definitely many of the planes would have been lost.

I know of three separate cases in the crop dusting business in which planes were left for the night securely tied down, but were on their backs in the morning, a total loss. During the night, the ceaseless pull of the gusts worked the knots loose in one case, pulled up the stakes in another, and snapped the ropes in the third.

The "rope-snapped" and one of the "pulled-stake" cases belonged to the American Dusting Company of Chicasha, Okla. They had three planes tied down at Munday, Tex., when a plains sandstorm struck. The ropes snapped on two ships; the stakes pulled up on the third.

As a result of this storm, American did some changing on tie-down methods—and their 68 Stearmans have taken everything the weatherman could dish out since in the way of wind, from plains sandstorms with 90-mile winds to Kansas twisters with heaven knows what.

What "changing" did American do?

First, they inves'ed $4.50 per ship in the new spring-steel "corkscrew" tie-down stakes shown in illustration "B." Believe it or not, these gizmos can be screwed right through almost anything but solid concrete—one *was* screwed right through the blacktop pavement in the background of illustration "B," by some experimental-minded pilots who fly for American.

Once in the earth, it is practically impossible to pull this type of stake up, and the steel coils will spring forever without breaking. You can purchase these for your own ship from almost any fixed base operator.

Second, the American Dusting Company went to heavier, top-grade manila ropes for all ships, each pilot using one of two types of knots, according to personal taste, it being considered the responsibility of each pilot to tie down his own ship safely.

Quite the opposite of the good judgment showed by American, another duster owner decided that bigger and better tie-downs were the answer, tied as tight as you could get them, to prevent the gust-imposed strain from snapping ropes because of slack. He bought three man-size, 1¼ inch pieces of high-grade manila rope, pounded long, heavy steep stakes deep into the earth under both wings, then cinched the ship down, but good and tight.

With the wind came rain; then sultry sun, followed immediately by broken spars in both wings, brought on by con-

traction of the hawser-type ropes. Also, the tie-down in illustration "A" is an excellent one, but a few more cents for a 7/8 inch rope might not be wasted. Note especially the knots; there is a *double* strand around the strut, and four safety knots on the main rope. Tied in this manner, a tie-down rope has a certain resiliency. This is due in part to the rope itself, but far more to the nature of the knots; it is a "shock-absorber tie-down."

When is an old rope too old?

There can be no hard and fast rule on this; because of differences in climate, type of plane the ropes are used on, etc. But let's look at it this way:

The best tie-down ropes that can be bought would cost from two to ten dollars—while the plane they hold costs from two to ten *thousand* dollars, often more. In view of these facts, why not replace tie-down ropes as soon as they lose their "new" color? Most manila will hold its bright color as long as it holds its strength.

Who's responsible for tie-downs?

If you will check CAR, you'll find that the *senior pilot* is *always* in command of the aircraft in flight, his authority superseding all other. It's true on the ground, too. If you're the pilot, tie-downs are your baby—not the line attendant, owner of the plane, or somebody else, but you.

Where, or at what points do you attach tie-down?

If your ship isn't equipped with tie-down rings which clamp on the strut or the permanent type built into the wing, buy some tie-down rings for $1.19 each from Air Associates or some like concern. Rings facilitate fast and safe tying down, and will tear the strut out by the roots before breaking. Cinch a loop around the strut for extra protection, if you choose. Tie the tail down by the tailwheel, with the stake as near the wheel as possible, so Old Man Wind can't get any leverage. *Lock your controls, always,* if you'll be back in 30 seconds. A snap whirlwind will batter control surfaces into ribbons, under certain conditions. Which brings us to: Short-term stops on cross-country. Should I tie down?

The wind was calm; the pilot was "only going to be gone a few minutes." The plane was a Stearman duster—and the field was a control airport. The pilot hurriedly ate lunch in the airport cafeteria, keeping a watchful eye on the limp wind sock. He finished his meal, arose to leave.

But, as fate would have it, who should walk upon the scene but a redhead, who liked the duster pilot's looks.

Love blossomed. He forgot about the wind sock. Forty-five minutes later, cupid was rudely interrupted by a sickening crunch, caused by the Stearman ramming the lunchroom tail first, propelled by a healthy breeze that rose as quick as a redhead's temper.

Damage was a thousand dollars; the CAA had a few not-so-kind words to say to the pilot. During the confusion, the redhead folded her charms and silently stole away. The pilot was inconsolable. There is no record of a horse, mustang or otherwise, ever having caused that much trouble. Especially if his owner knew "when was a tie-down." END

AT LAST-

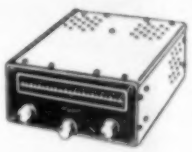
Here's The Answer!

LOW COST VHF FOR YOUR PLANE

WHAT DO YOU NEED - FILL IN THE TABLE BELOW ADD AND COMPARE!

VHF RECEIVER, TUNABLE 108 TO 128 MCS, *WITH SQUELCH* 99.50	
VHF TRANSMITTER, *COMPLETE WITH 5 CRYSTALS* 79.50	
MODULATOR/POWER UNIT, *COMPLETE WITH JUNCTION BOX AND CABLES* 89.50	
TOTAL →	

CAN YOU BEAT IT?

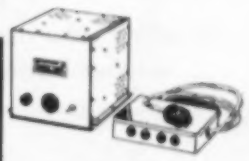


AEROTRON
MODEL 200 VHF RECEIVER

- ★ Exclusive Front Panel Adjustable Squelch.
- ★ Large, Clear Slide-Rule Type Tuning Scale.
- ★ Rugged Copper-Clad Aluminum Chassis.
- ★ Easy To Mount — Only 4 Screws. No Shock Mounting Required.
- ★ Lightweight—Less Than 1½ Lbs.
- ★ Full Automatic Volume Control.
- ★ Capacity Type Tuning With Rugged Direct Gear Drive.
- ★ Built-In Provision For Omniset.
- ★ High Sensitivity, High Output.

AEROTRON
MODEL 200 VHF TRANSMITTER

- ★ Complete With 5 Crystals.
- ★ Provision For 5 Additional Crystals.
- ★ Hi-Fi Clarity.
- ★ Lightweight—Only 10 Ozs.
- ★ Rated 3 Full Watts.
- ★ Built In Provision For Whistle Tuner.
- ★ Rugged, Dependable, Compact.
- ★ 3 MC Spread.



AEROTRON
MODEL 230 MODULATOR/POWER UNIT

- ★ 180 Mils Continuous Service.
- ★ 250 Mils Intermittent Service.
- ★ Quiet Hum-Free Operation.
- ★ Lightweight—Less Than 7 Lbs.
- ★ Long-Life Patented Vibrator.
- ★ 20 DB Audio Gain.
- ★ Full Four Watts Audio Output.
- ★ Adequate Reserve Power For 3 Transmitters, 2 Receivers, Omni, and other Accessories

SEE YOUR NEAREST AEROTRON DEALER OR WRITE DIRECTLY TO:

AEROTRON AERONAUTICAL ELECTRONICS, INC.
P. O. BOX 6048 RALEIGH-DURHAM AIRPORT
RALEIGH, NORTH CAROLINA

ALL TAXES, WHERE APPLICABLE, ARE EXTRA. ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

EXECUTIVE TRANSPORT AIRCRAFT
All Models
BEECHCRAFT LOCKHEED
CONVAIR GRUMMAN
DOUGLAS CESSNA
AERO COMMANDER
WELSCH AVIATION COMPANY
60 East 42nd Street, Suite 729
New York 17, New York Murray Hill 7-5884

EXECUTIVE - PILOTS - PRIVATE
SNACK BAR - UNICOM - LIGHTS
ROTATING BEACON
30 MI. S. WASHINGTON, D. C.
SHANNON AIRPORT
FREDERICKSBURG, VA.
Fast Ground Connections - Bus - Train
Our Suburban Taxi Service
PH.: ESSEX 3-4431 80-91 OCT.

FINE USED AIRCRAFT
AIRPLANES—BUY, SELL, TRADE, FINANCE
We stock aircraft in all categories—
BEECH, CESSNA, NAVION, PIPER, etc.
We offer the best buys in some of the finest used aircraft available.
WE OWN THESE AIRPLANES
DEAL DIRECT AND SAVE!
Our stock list is published twenty-four (24) times a year. $1.00 per year to cover costs will put you on our mailing list. Latest list describing our entire stock, including specifications and prices, will be sent immediately.
OUR STOCK IS CONTINUALLY CHANGING.
WE HAVE BETWEEN 20 AND 30 AIRCRAFT BASED IN CHICAGO AT ALL TIMES.
FINANCE WITH 1/3 DOWN
GRAUBART AVIATION
MOhawk 4-7100
677 North Michigan Avenue, Chicago 11, Illinois

CONVERSIONS

all types of Aircraft

TYPICAL PINELLAS CONVERSION
(Using the McKinnon-Hickman method for the Grumman Widgeon)

New Lycoming 270-hp engines installed

- Maximum speed increased to 185 mhp
- Cruising speed increased to 160 mhp at 65% of power
- 600 foot land take-off made possible
- Ability to maintain 8,500-foot altitude on one engine made possible.

New Hartzel props installed

Overwing exhaust installed

- Custom Conversion
- Engineering
- Aircraft Modification
- Aircraft Procurement
- Maintenance and Repair
- Overhaul

From a new prop to a major conversion job on a multi-engined craft—Pinellas is your best source of service and satisfaction. Pinellas offers the most highly skilled aircraft technicians in the South, as well as the most complete service facilities at the field. We are positive that the same standards of service we've rendered our other customers can be of the utmost satisfaction to you, too—no matter what your aircraft needs may be.

PAS

PINELLAS AVIATION SERVICE, INC.
Phone: ST. Petersburg 41-0165

Pinellas Aviation Service, Inc.
Pinellas International Airport
St. Petersburg, Florida

Gentlemen:
Please send me complete information about your service and facilities.

Name_____

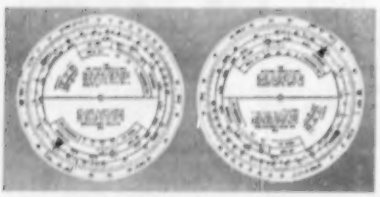
Address_____

City_____ (Zone)_____ (State)_____

Type of Aircraft owned_____

A new computer

for pilots who are not mathematicians



the Mark 8-C...only $2.50!

If you're one of the thousands of pilots who want a simple, fast, pocket-size computer for navigation problems—then the Mark 8-C is for you. Determines true airspeed, altitude, groundspeed, ETA, fuel consumption, and conversions, with one-hand operation. Compass rose for plotting bearings and courses. Complete instructions. . . . Be among the first to own a new Mark 8-C. Check this ad and mail your order today!

- ☐ **New Mark 8-C computer, only $2.50**

And note this fine equipment:

- ☐ **Weems Mark II plotter ($2.00)**
- ☐ **E-6B computer, with case ($10.00)**
- ☐ **Manual of E-6B computer ($3.00)**
- ☐ **Pilots' RayBan sunglasses ($8.75)**
- ☐ **Steele's pilot logbook ($1.50)**
- ☐ **4-color chrome pencil ($2.15)**

Check the items you want, fill in the blanks below, then clip this ad and send it to:

PAN AMERICAN NAVIGATION SERVICE
12021 Ventura Blvd., P-11
North Hollywood, Calif.

☐ Payment enclosed. ☐ Send C.O.D.
☐ Send me a free copy of your complete catalogue.

Name_____

Street_____

City & State_____

BONANZA OWNERS

Head Rest Kits

No Structural Change in Aircraft Required
Two Hour Installation
Harmonizing Upholstery
Foam Rubber Padding
Instantly Detachable
Weight, Approximately ½ Lb.

Reclining Seat Kits

No Structural Change in Aircraft Required
Two Hour Installation
Rugged and Simple to Operate
Weight, Approximately 1 Lb.

Cadmium and Chrome Plated Steel Construction
For BEECHCRAFT BONANZAS Models A-35, B-35 and C-35.
Complete Diagrams and Instructions with each Kit.

MERCURY Flying Service, Inc.

BEECHCRAFT SALES and SERVICE
2417 East Buchanan Street
HARBOR AIRPORT
PHOENIX, ARIZONA

Hangar Flying

(Continued from page 41)

but it kept behaving the same way. Everything was perfect--instruments, engines, etc. I kept on flying for about ten minutes, trying to make up my mind whether to keep going or to turn back, and finally decided for the latter.

I advised Torreon that I was coming back on account of strange vibration at the control surfaces. After 25 minutes descent from 12,000 feet, I must have touched wheels at about 100 mph and noticed that the tail wheel hit hard on the ground almost as soon as the front wheels touched. And at 100 mph!

I taxied to the ramp and immediately got out with my flashlight to check on the tail assembly. When I got there, someone was sitting on the tail. I thought it was one of the mechanics, but when I shone the light on his face, he was someone I had never seen before. I told him to get off the stabilizer, but he couldn't move. He was almost frozen and his shirt was completely torn off. He had flown for 57 minutes on the tail of the DC-3!

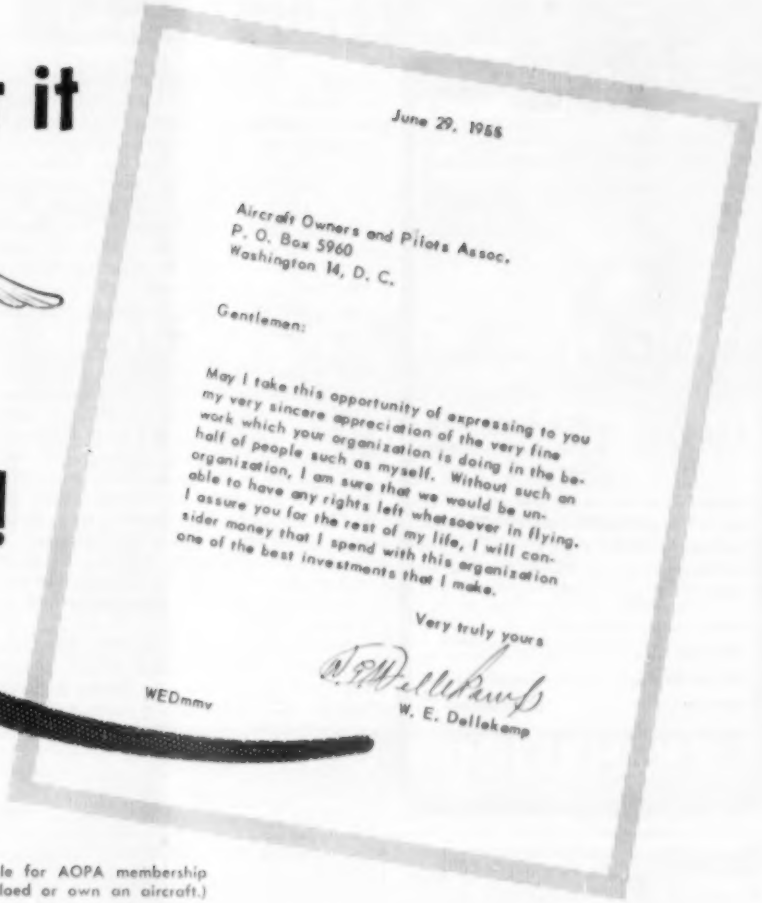
He was an 18-year-old farm kid who thought it would be easy to catch a free ride to Mexico City, 500 miles away. He had hung on, lying prone on the right hand fixed stabilizer, clinging to the leading edge by his armpits!

The boy was Cliserio Reyes Guerrero, and since that time, he has taken flight training. Did anyone ever have a stranger indoctrination to the air? And how glad I am that I turned back to investigate the unusual behavior of my aircraft. CAPT. JORGE L. GUZMAN
Cuernavaca, Mexico

"HE'S HAD TO WEAR IT EVER SINCE THEY ROUTED AN AIR LINE THROUGH HERE."

He will wear it

the rest of his life!



June 29, 1955

Aircraft Owners and Pilots Assoc.
P. O. Box 5960
Washington 14, D. C.

Gentlemen:

May I take this opportunity of expressing to you my very sincere appreciation of the very fine work which your organization is doing in the behalf of people such as myself. Without such an organization, I am sure that we would be unable to have any rights left whatsoever in flying. I assure you for the rest of my life, I will consider money that I spend with this organization one of the best investments that I make.

Very truly yours

W. E. Dellekamp

WEDmmv

More than 47,000 pilots are proudly wearing the AOPA wings — an overwhelming vote of confidence in AOPA and for its program.

(You are eligible for AOPA membership if you have soloed or own an aircraft.)

Here's what your $10 investment gives you in AOPA

• Important informational services • Strong representation in Washington to fight unsound flying legislation and encourage helpful legislation • Unusual and exclusive insurance coverage of all kinds including a $700 flying accident policy • A copy of the AOPA edition of FLYING magazine each month • Exclusive chart subscription service • Flight assistance and servicing to all parts of the world • A monthly confidential newsletter from Washington • AOPA Air-Charge Card • Hertz Driv-Ur-Self System, Avis Rent-A-Car and TWA courtesy cards • AOPA Safety Service • Servicing help with any and all types of your flying problems.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION
National Headquarters, Dept. F 115
Post Office Box 5960
Washington 14, D. C.

I would like to apply for *Active Membership* in AOPA. Enclosed please find my check or money order in the amount of $10.00.

Name _____ Age _____
Address _____
City _____ State _____
Employed By _____
Address _____
City _____ State _____
Bank Reference _____
Address _____
City _____ State _____
Pilot License Number _____

Ratings _____
I first soloed an airplane at _____
Date of First Solo _____
I own aircraft, registration number _____
Make _____ Model _____
Signature _____

IMPORTANT

I UNDERSTAND THAT I AM TO RECEIVE A $700.00 AMERICO FLYING-ONLY PERSONAL ACCIDENT INSURANCE CERTIFICATE. (RESTRICTED TO THE UNITED STATES, ITS POSSESSIONS, CANADA AND MEXICO.)

_____
Name of Beneficiary

_____
Relationship

($2.00 of each year's dues are for my subscription to the AOPA edition of FLYING)

Pilots

PRIVATE AND COMMERCIAL

Be a REGISTERED pilot in the new **AIRCRAFT PILOTS REGISTER** now being compiled. Fill and send coupon below. Two dollars to cover registration fee and **YOUR COPY.**

LUBAR-GYDE, INC.
204 FRANKLIN STREET
NEW YORK 13, N. Y.

Please include my name, address and ratings in **THE AIRCRAFT PILOTS REGISTER.** Enclosed is (check) (money order) for two dollars to cover registration fee and my copy.

Name _____

Address _____

City and State _____

PRIVATE ☐ COMMERCIAL ☐

Ratings _____

The only complete book on all kinds of jets

626 photographs,
120 drawings,
444 silhouettes

ONLY $6.95

EVERY jet aircraft ever built pictured and described!

Every jet, rocket, or turboprop airplane or helicopter built by any country is fully described *with all vital statistics and technical data.* Includes full data on specifications, performance, and armament. Full-page, 4-view tone drawings of 30 newest aircraft. Includes data tables on every aircraft gas turbine ever built, and a full engine index and aircraft index. This big 9" x 12" book —featuring 3-view identification silhouettes and photographs—will be an invaluable source book for engineers, technicians, designers, students, aviation enthusiasts for years to come. ORDER NOW! ONLY $6.95 from:

HANOVER HOUSE
503 Franklin Avenue
Garden City, N. Y.

Shades of the Buffalo

(Continued from page 34)

saving of this species by the Canadian Government is quite as remarkable as the recent painless "branding". This type survived in sub-Arctic Canada. Other original immigrants during this long period of time spread across the entire continent as far south as Mexico. Sub-species developed: Plains and Mountain. The Wood Bison is hardier, larger, darker of coat with slightly different tapering horns. The Mountain Buffalo were exterminated; only a few Plain Buffalo remain today in private parks.

By 1900 the "Wood" species numbered only a pitiful 300. In 1903 the Canadian Government made killing of Wood Bison illegal. Protection was so effective that by 1922, the mammalogist's survey showed an estimated 1,500 head. Encouraged, the Government in the year 1926 laid out the largest animal sanctuary in the world. It is 175 miles long by 145 miles wide, contains 17,300 square miles. This is patrolled by airplane, and eight wardens by land and water. A recent aerial survey of the many herds estimated the animals now to number 15,000.

Vast though the Park may be, there are only 4,000 miles of *winter range,* vitally important to the animal. To the general public, 4,000 miles would seem sufficient to feed 15,000. It is to date. However, the yearly increase of the herds, requires a counter check. Thus, in late autumn, after freeze-up, a selected number of animals are rounded up by airplanes and slaughtered. To date, 1,200 have been thinned out. The meat is sold throughout Canada. Also high class restaurants in the U.S.A. take considerable quantity. The robes and part of the meat are given to the different Missionary Stations in the N.W.T. and to needy Indians.

The Bison in the Park are divided into a number of herds, of different size, widely scattered over the enormous range. They travel back and forth at different seasons by many routes. At present the movements are not known. And the mammalogists, in their compiling data on the animal, its increase, distance and direction of going here and there; and to learn many other basic biological factors, need a definite method of tracing. To corral even a few extremely powerful and ferocious wild animals, some weighing up to 3,000 pounds, and brand them by the usual hot-iron method, was obviously impossible. Yet animals from herds scores of miles apart had to be marked.

The mammalogists hit upon the unique idea of spraying them with sheep dye from a helicopter. From this "branding" it is certain that much reliable biological data sought by the scientists may be obtained.

When subsequently, the next annual Bison thinning takes place, the mammalogists will make their first check on animals killed from the different herds. Then, by comparative records and graphs and other biological tracings, they will draw their deductions and form policy. If the experiment affords satisfactory results, spraying of larger numbers will be carried out in following years.—END

Would YOU Like to Make $1,000 A MONTH?

That's What Stanley Hyman Made Selling the PRESTO

AMAZING MIDGET FIRE EXTINGUISHER

Stanley Hyman

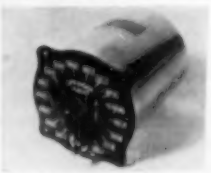
Science's New Midget Miracle— "PRESTO"

Sensational new kind of fire extinguisher that does same job as bulky extinguishers costing 4 times as much. Ends fires fast as 2 seconds, fits in palm of hand. Never corrodes—*guaranteed for 20 years!* PRESTO sells for only $3.98, and you make liberal profit on every one. Show to owners of cars, homes, stores, factories, offices, boats, farms, and to stores for re-sale. Everyone fears fire, everyone's ready to order fast. You make good income. Write for big FREE Sales Kit, money-making plans, no obligation. If you want a regular Presto to use as demonstrator, send $2.50. Money back if you wish.

MERLITE INDUSTRIES, Presto Div.
114 East 32nd St., Dept. S-9, New York 16, N.Y.
In Canada: Mope Co., Ltd., 171 Dowd St., Montreal I, P. Q.

STOP ASKING FOR A COUNT!

CRYSTAL TUNING



NO LONGER IS IT NECESSARY TO ASK "FOR A COUNT" to enable you to tune in a Tower or Airways Station. Make the simple installation—weight is only 1 lb. of a **SPRINGER AR1G CRYSTAL CALIBRATOR.** By using this outstanding new instrument, any one of 16 selected Crystal Controlled Channels from 118-128 MC can now be instantly tuned in on your present VHF Receiver without even looking at the Dial!

CRYSTAL CONTROLLED RECEIVER RESULTS WITH YOUR PRESENT VHF RECEIVERS

SPRINGER MODEL AR1G basic unit with 3 crystals only . . . $68.75

See your Dealer or write to:

EARL W. SPRINGER
AIRCRAFT RADIO COMPANY
Sky Harbor Airport
Route 11, Box 730 Indianapolis, Indiana

SKILLED PILOTS AVAILABLE

Has your company taken to the air? You can't afford to have any but the best pilots. Supplement your staff with these services:

- √ **ACCESS to a large reservoir of professional pilots and skilled flight personnel.**
- √ **CAREFUL screening of applicants according to your specifications and needs.**
- √ **PSYCHOLOGICAL testing and selection services to insure utmost protection for personnel and equipment.**
- √ **COMPLETE consultation service.**

Pilots Employment Agency

Teterboro Airport, New Jersey
Hasbrouck Heights 8-1214

Hangar 3, Gate 113
Lockheed Air Terminal, Burbank, Calif.
THornwall 4-3646

I Learned About Flying From that!

(Continued from page 48)

me like a ton of bricks. The night was no longer beautiful to me.

Everything went through my mind at once. I wasn't prepared for this and had hardly glanced at my let-down procedure, let alone memorized it, which is necessary in a Jet fighter due to the speed and limited room in the cockpit. My wing man had less than 20 hours in the F-86 and just a few hours formation flying since he had come back on flying status. I had not flown actual weather in over six months, and those mountains were 10,000 feet.

Should I turn back or continue? I made a quick fuel check to see if we had enough for return to Rapid City. That avenue proved fruitless. We would be sucking fumes 50 miles short. I started to break out in a cold sweat as I weighed the facts. I guess you could call it mild panic. I got out my let-down book and started to study. I was all thumbs and it took me twice as long as normal to learn the procedure. Five minutes out from the Ogden homer, I gave them a call. They cleared me for let-down to 20,000 and told me to report over the cone when I started the let-down.

We entered the soup at 27,000 into the top of a big cumulus. The turbulence started. Then I thought, "I've been depending on this radio compass too much. In the middle of a thunder storm, it's not too dependable." I had completely forgotten that I was on the beam and could listen to the "on course" signal, so I blundered on down using the old "bird dog" and losing faith in it by the minute. In fact, I was watching it so much that I found myself ignoring the rest of my instruments.

The needle finally swung around and I gave Approach Control a call. All I could think of were the mountains, my wing man, and that I was losing confidence. This last worried me most because I knew this let-down had to be a good one. At 15,000 we ran into sleet. I called my wing man and told him to be sure he had his windshield anti-ice and canopy defrost on. Every time I sneaked a look to see if he was still there, his little red wing light was tucked right in behind my trailing edge. This guy was doing a great job of hanging on. I knew he was putting all his faith in me and it made me feel guilty. If I could only get my confidence back!

I leveled out at 11,000 and drove back to the middle cone. We were now in heavy rain and still clearing the mountains, even if the radio compass was homing in on the core of the storm. The needle did a good healthy swing, clear and definite. This helped give me renewed confidence, but final let-down and low approach was the one that counted.

On the way down I thought, "If I live through this let-down, they will never catch me unprepared again." After I made the procedure turn and was on "in-bound" heading, doubt continued to grip me. I was sure I had made it the right way but felt I was headed into the mountains. But before I really panicked,

(Continued on page 74)

CAA RATINGS IN A HURRY

EARN MORE! with a higher rating

COMMERCIAL, INSTRUMENT, ATR, INSTRUCTORS, A & E, OTHERS

Our personalized instruction will allow you to obtain your CAA ratings immediately. Our Ground School, instructors and flight equipment are the finest. Complete ground school for written exams as well as flight time. Room and board available at reasonable prices. Write for free information.

WE HAVE TRAINED OVER 700 STUDENTS IN THE LAST 14 MONTHS

UNDER THE DIRECTION OF JOSEPH R. ROSS

ROSS SCHOOL OF AVIATION

BOX 7071-F MUNICIPAL AIRPORT TULSA, OKLAHOMA PHONE 85-1730

STUDY FOR CAA EXAMS AT HOME

Use a Ross Questionnaire to prepare for your CAA exams. They are the finest available. Our frequent revisions insure your receiving the very latest information including navigation and meteorology maps. Order today —

☐ PRIVATE PILOT	$1.00
☐ COMMERCIAL PILOT	$5.00
☐ INSTRUMENT PILOT	$5.00
☐ AIRLINE TRAN. PILOT	$5.00
☐ FLIGHT INSTRUCTORS	$5.00
☐ ENGINE MECHAN[illegible]	$4.00
☐ AIRCRAFT MECH[illegible]	$4.00
☐ FLIGHT ENGINE[illegible]	$5.00
☐ GROUND INSTRU[illegible]S	$5.00
☐ PARACHUTE RIGGER	$4.00
☐ CONTROL TOWER OPERATOR	$4.00
☐ C.A.R. FOR PILOTS	$ .50
☐ **Complete set of above 12 Books**	**$15.00**

ROSS AERO PUBLISHERS
BOX 7071-F MUNICIPAL AIRPORT
TULSA, OKLAHOMA

☐ Payment enclosed. ☐ Send C.O.D.
Please send items I have checked at left.

NAME _____

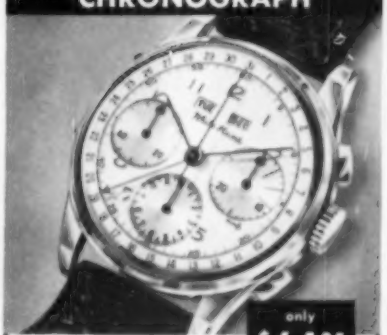
ADDRESS _____

CITY & STATE _____

ROSS AERO PUBLISHERS

BOX 7071-F MUNICIPAL AIRPORT
TULSA, OKLAHOMA

12 HOUR CALENDAR CHRONOGRAPH



Our exclusive, "12 hour" calendar chronograph worn by more pilots throughout the world than any other watch. Regularly $200

only **$64.95** Fed. Tax Included

NOTE THESE WONDERFUL FEATURES:

- 17 jewel movement • Stainless steel case
- Stopwatch • 2 pushers — six hands
- 1/5 second sweep hand with time out feature
- Shows day, date, month
- 30 minute and 12 hour recorder dials
- Anti-magnetic • Unbreakable crystal
- Extra thin • Incabloc • Shock resistant

GUARANTEED! Your money back in ten days if not satisfied, for any reason. MAIL ORDERS promptly filled. Shipped post-paid for check or M.O. or will send C.O.D. Expert repair service available on all multi-purpose watches and instruments.

Free complete catalog of watches, chronographs and instruments with every order.

WHITE PLAINS WATCH CO.
15 WEST 47th ST., NEW YORK 36, N. Y.
JUdson 6-1752

PILOTS

INCREASE YOUR EARNING POWER! *Get Your* INSTRUMENT and AIRLINE TRANSPORT RATING *Now*

Train at AMERICAN FLYERS—the world's largest instrument and Airline Transport School — and insure YOUR future in aviation. American Flyers has trained more pilots for the Airlines than any other school in the country—MORE THAN ALL OTHER SCHOOLS COMBINED!

If you want the most modern and efficient flight instruction—whether you are a veteran or civilian pilot —write to us for our free booklet outlining the courses we have to offer.

VETERANS— Your certificate of eligibility from the Veterans Administration is all you need to enroll at government expense for any of our courses under the G.I. Bill of Rights!
Courses start at any time—no waiting!

Now **you can obtain a C.H.P. or TYPE RATING on our DOUGLAS DC-3s under the G. I. BILL**

AMERICAN FLYERS INC.

MEACHAM FIELD FORT WORTH 6, TEXAS

MAIL THIS COUPON TODAY

Please send me FREE Booklet and data on
☐ INSTRUMENT ☐ CIVILIAN
☐ AIRLINE TRANSPORT ☐ VETERAN

NAME _____

STREET _____

CITY _____ STATE _____

He's alive... and you helped

People still die from tuberculosis—this year one American every twenty-seven minutes!

Yet the money which you give for Christmas Seals has helped to save thousands of lives.

Christmas Seals fight tuberculosis year-round—through education, case finding, patient rehabilitation, and research.

Make Christmas Seals a part of *your* holiday giving, today.

Buy and use Christmas Seals

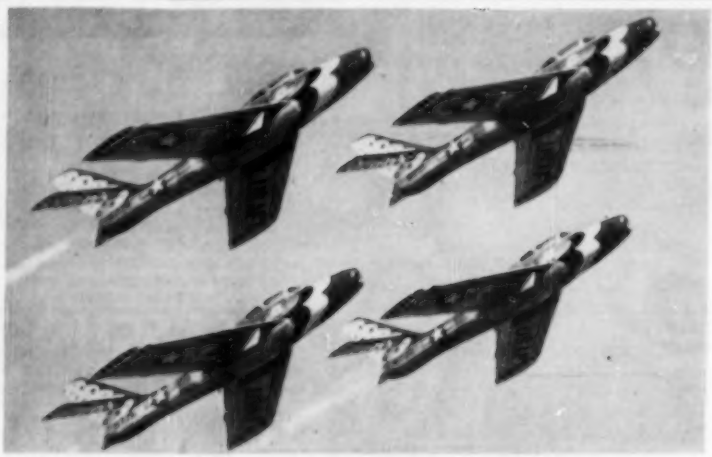
Because of the importance of the above message, this space has been contributed by

ZIFF-DAVIS Publishing Company

HILLER DEVELOPMENTS ...speed you into the future

Now a major supplier of production and research aircraft to the military forces, work of Hiller Helicopters today will benefit commercial products of tomorrow.

HILLER HELICOPTERS
PALO ALTO, CALIFORNIA



1955 NATIONAL AIRCRAFT SHOW

This year's show was purely and simply military. Its record-breaking attendance of almost 300,000 Philadelphians gave every appearance of enthusiastic approval. Air Force's "Thunderbirds" (above) and Navy's "Blue Angels" had the crowds spellbound with the superb perfection of their formation aerobatics, while scorching low-level fly-bys of supersonic jets such as the F-100, F-101 and F-102 left them gasping. Army's helicopter square dance and Navy's carrier take-offs from the USS *Ticonderoga* moored adjacent to the field, were big hits. But most impressive of all was the success of the static exhibits . . . thousands continued to line up for them even after the flying part of the show had started.

(Continued from page 73)

we broke out of the bottom. It was raining hard and we could see only straight down. I got station passage over low cone. Now the heading to the field and we will have it made.

But what was that heading? I couldn't remember. I started a 360 degree turn to stay over the lights and near the cone, and called the tower for the heading to the field. In a Jet you can cover a lot of ground in the time it takes to call and get an answer. I could have looked at my let-down chart, but to turn up the cockpit lights and look at a chart this close to the ground at night is not conducive to longevity.

The tower gave me the heading and soon our wheels were making contact with that beautiful runway. After parking, I got out and started pulling my preflight inspection in the rain while thinking about my mistakes and how they could have been prevented.

We have all read aircraft accident reports. They usually state a principal cause and nothing more. I firmly believe that a series of events leads up to every accident. In my case, overconfidence to begin with, poor flight planning, being lazy and in a hurry, and lack of self discipline formed the background for a serious accident.

I had had a chance to make a practice instrument let-down at Hill about a month prior to this, but thought a fly-by would be more fun. Right there I started to build a disaster. That it never fully caught up with me is my fortune—not my desert. END

GENUINE NAVY INTERMEDIATE PILOT JACKET

U.S.N. ISSUE

$32.50

—FOR A LIMITED TIME ONLY. Shipped postpaid if remittance accompanies order.

Brand new, Genuine dark brown Goatskin leather with zippered front. Bi-swing back, two patch pockets, one inside snap pocket. Mouton fur collar, Celanese lined 100% wool cuffs and waist band.

FINEST JACKET MADE

Sizes 34 to 46—$32.50; Sizes 48 to 50—$35.00
State Size Wanted
(A clipping of this advertisement is not necessary when ordering)

FLYING EQUIPMENT SALES CO.
Dept. F
1639-45 W. Wolfram St. Chicago, Ill.

FLEX-O-PROP

Most models only

$89.00

IMPROVE YOUR CRUISE and TAKE OFF
SELF ADJUSTING VARIABLE PITCH ONE PIECE PROPELLER

Approved for all Aircraft up to 165 HP
Write to
MUNK AERO. LAB., INC., Brentwood, Md.

VISUAL TRAINING
OF CANDIDATES FOR
PILOT RATING
To Meet Eyesight Requirements of C.A.A. or Air Force Exams
DR. JOHN T. FLYNN
OPTOMETRIST - ORTHOPTIST
Visual Training Specialist
300 W. 23rd St., New York City

BOWERS BATTERIES

Always Better

BOWERS BATTERY & SPARK PLUG CO., READING, PA.

Flivver Check List

(Continued from page 42)

strokes. CAUTION: Avoid overpriming. (Excessive gasoline washes lubrication from the cylinder walls.)

10. Throttle slightly OPEN.

11. Turn ignition switch to BOTH.

12. Start engine by pulling through with a snap.

DURING WARM-UP:

1. Carburetor air heat COLD.

2. Open throttle slightly more.

3. Maintain speed between 700-900 rpm for at least 5 minutes.

4. Minimum oil pressure: 20 lbs. for minimum cruising; 35 lbs. for maximum cruising, and 10 lbs. idling.

5. Open throttle after oil temperature has reached 100 degrees F.

BEFORE TAKE-OFF:

1. Check controls for free operation (ailerons, elevators, rudder).

2. Check LEFT and RIGHT magnetos separately. Engine speed should not drop off more than 75 rpm on either magneto.

3. Check trim tab setting.

4. Minimum oil temperature 120 degrees F. Maximum oil temperature 220 degrees F.

5. Carburetor air heat OFF unless icing conditions prevail.

6. Taxiing speed SLOW.

7. FULL THROTTLE, head into wind, wings level.

8. Move stick forward until tail rises.

9. When flying speed is attained, apply back pressure on stick for take-off.

10. Relax pressure to gain speed of 55 mph.

DURING FLIGHT:

1. During take-off and climb, the engine should be kept at FULL THROTTLE until a safe altitude is reached.

2. Carburetor air heat COLD unless icing conditions prevail.

3. Maximum oil temperature 220 degrees F.

4. Minimum oil pressure—21 lbs.

5. Diving speed limit 122 mph. Use carburetor air heat.

(Continued on page 76)

SAVE TWO PRECIOUS YEARS

1 2 ~~3~~ ~~4~~

STUDY AERONAUTICAL ENGINEERING

AT NORTHROP INSTITUTE

Northrop Aeronautical Institute is recognized by all employers of Aeronautical Engineers as a source of thoroughly trained men, men who make a success in Aviation. That is why there is a waiting list for Northrop graduates.

Northrop courses are concentrated, yet complete

Aeronautical Engineering Technology—2 years

Aircraft and Engine Mechanics—1 Year

The time you save by training at Northrop will be worth literally thousands of dollars to you in dollars saved and extra money earned. Before many others are out of school, you can have a job in aviation . . . with the kind of training needed to zoom ahead . . . ahead of the crowd toward success.

Northrop is an
ACCREDITED TECHNICAL INSTITUTE

Northrop is
APPROVED FOR VETERAN TRAINING

Northrop training fulfills the educational requirements for Air Force Cadet and Naval Aviation Cadet training.

Take your first step toward
SUCCESS IN AVIATION
WRITE TODAY FOR FREE CATALOG

Northrop
Aeronautical Institute
An Accredited Technical Institute
1119 W. Arbor Vitae Street
Inglewood 1, California

MAIL THIS COUPON TODAY!

NORTHROP AERONAUTICAL INSTITUTE
1119 W. Arbor Vitae Street, Inglewood 1, California
Please send me immediately the Northrop catalog, employment data, and schedule of class starting dates. I am interested in:
☐ Aeronautical Engineering Technology
☐ Aircraft Maintenance Engineering Technology
☐ Master Aircraft and Engine Mechanic
☐ Jet Engine Overhaul and Maintenance
Name ..... Age .....
Address .....
City ..... Zone ..... State .....
Veterans: Check here ☐ for Special Veterans Training Information.

DS-5
audio isolation system
Finest pilot-copilot cockpit audio isolation system providing complete dual stations, 12 audio channels per station, phone use, 4 watts per station output, integral interphone system and better than 60 DB between stations.
for details and prices write:
FLITE-TRONICS, INC.
3303-A Burton Avenue
Burbank, California

AIR LINE CO-PILOT

EASTERN AIR LINE'S EXPANSION PROGRAM REQUIRES ADDITIONAL CO-PILOTS.

If you are interested in job security, opportunity for advancement, excellent pay, retirement plan, broad insurance coverage, this is your opportunity for a life-time career with America's Most Dependable Air Line.

To qualify for consideration—Age 21-30, height 5'8"—6'4", U.S. Citizen, high school graduate, 500 hours certified Pilot time. Must have Commercial. Current Instrument Rating preferred. Pass Company flight physical. With 1500 hours or more will consider men up to age 32.

Consider your future — apply now for current and future employment. Write immediately to Capt. F. B. Kern, Chief of Pilot Training, **Eastern Air Lines, Box 787, Miami 48, Fla.**, detailing personal qualifications, work experience and flight time.

(Continued from page 75)

6. Never exceed 2,300 rpm in dive or level flight.

7. Minimum cruising—2000 rpm.
Normal cruising—2150 rpm.

BEFORE LANDING:

1. Carburetor air heat ON.

2. Glide at 60 mph. Slow glide ratio 9:1.

3. Head into wind, throttle slightly open Minimum rpm 900-1,000.

4. Optional: set stabilizer to bring nose up.

5. Close throttle just before landing engine idling.

AFTER LANDING:

1. Do not cut ignition switch immediately after landing.

2. Close fuel supply.

3. Idle engine until fuel runs out.

4. Ignition switch OFF.

5. Open throttle slowly.

6. Check fuel valve OFF.

7. Throttle OFF.

8. Ignition switch OFF.

9. Carburetor air heat OFF.

10. Cabin heat OFF.

11. Lock aileron and elevator controls by wrapping front seat belt completely around rear control stock, tighten and buckle.

12. Chock the wheels.

It will be noted that the check list advises putting carburetor heat on before reducing power for the landing glide. This serves a two-fold purpose. First, it insures that no ice will form in the intake manifold or carburetor throat. Second, if the glide is of any length, the idling engine can cool to a point where the fuel mixture will not vaporize properly. If full throttle is needed to pull up and go around there is a possibility of the engine not taking hold. Carburetor heat will warm the mixture and tend to keep it at a temperature where it will vaporize properly. Also engine temperature can be maintained by opening the throttle gently every 200-250 feet of descent to "clear" the engine.

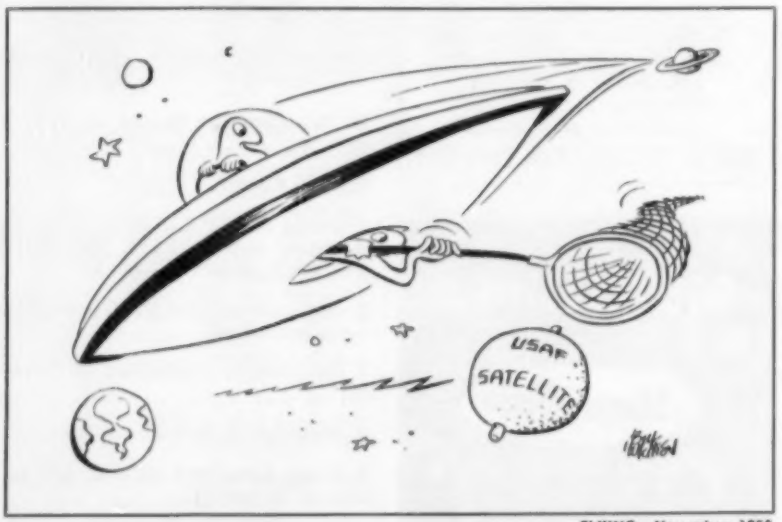
And while we are on the subject of engine operation tips, here are three more important ones:

(A) If the engine fails to start at the initial attempt repeat the procedure of pulling through the propeller, but this time with the ignition switch OFF and the throttle slightly cracked. This will pump some more fuel into the engine.

(B) On the other hand, if too much gasoline has been primed into the cylinders (gasoline will be smelled or seen dripping from the engine), turn the ignition switch to OFF, open the throttle wide and turn the propeller backwards to unload the engine. Then close the throttle and repeat the starting procedure of snapping through the prop with the ignition ON.

(C) When the engine does start, remember the other fellow. Do not point the airplane in such a direction that the prop blast blows into hangars or on other ships. And be sure to check oil pressure. *Do not continue engine operation* if the pressure does not come up within 30 seconds. Stop the engine immediately and determine the source of trouble.

Well, that's about all there is to a check list for a flivver. Transcribe the information onto a card and hang it near the instrument panel. Use it on the next flight and notice the increased relaxation you have attained. END



"Nobody has ever been at the top of this mountain!"

Small Planes and Big Cities

(Continued from page 27)

who came to Commodore first as a student pilot and stayed to marry the boss. She forms with him, one of the most effective selling teams private flying has seen in Northern California. According to CAA officials, the Commodore Roster of 80-plus active students, private and commercial, is the largest in the area. And they'll tell you that it's easily the most enthusiastic.

Each Commodore student automatically becomes a member of the Commodore Float Flyers, eligible and encouraged to join in club meetings, breakfast flights, spot landing contests, club bowling, hangar flying and all those things which once made flying so much fun. As part of the Float Flyers' operation, Alice Law produces a monthly bulletin of the club's activities. Called "Prop Wash," the house organ is mailed free to all students and to a long list of prospectives.

From the purely business standpoint, the Commodore student is offered a "package". It includes 16 half-hour flight lessons as well as ground-schooling in navigation, meteorology, theory of flight, aircraft engines and air traffic rules. The tuition can be spread over months. The student is granted a 15 per cent discount on plane rental for three years following his licensing. Through Law's arrangements with airports in the area, his students can rent land planes at the same discounted rate, and also have available the Float Flyers' appraisal and discount services when he decides to buy his own plane. In addition, students are provided with log books, maps of the area, computers and solo certificates . . . all at no extra charge. These factors, coupled with a liberal use of "guest hops," help explain the strapping growth of the Commodore student list.

Important as it is, however, the student part of the business is just that . . . a part. In addition, Bob and Alice have built one of the most active passenger-hopping operations ever seen around the golden gate. On a summer day, as many

(Continued on page 78)

CAA RATINGS

QUICK & EASY

Our CAA Exam Aids & Books Will Help You Get Any Rating

EXAMS

These CAA exam aids train you completely and easily at home. They include the necessary selected information and a refund slip. They are frequently revised assuring you receiving the latest CAA exam aids. Thousands including airlines and schools have proved our CAA exam aids get results. Mail the coupon today.

A&E PRACTICAL

This book clearly explains how to easily pass both CAA mechanic practical tests. It has weight ad balance explanations, welding instructions, new requirements, oral questions and answers, demonstration jobs, diagrams, surprising data, refund slip, etc. Mail the coupon today.

CHECK FLIGHT

These check flight books clearly explain how to easily pass the CAA check rides. They describe the new CAA maneuvers, new requirements and how to save money and time. They have surprising information, diagrams, short cuts, and data not found in regulations. Mail the coupon today.

HOME STUDY NAVIGATION

This navigation book clearly explains how to work every type of CAA commercial, instrument, ATR navigation problem and the E6-B computer. The explanations are simple, clear, step by step and easy to understand. You won't need an instructor if you have this book. Mail the coupon today.

( ) Commercial Pilot Written Exams
( ) Commercial Check Flight Book
( ) Home-Study Navigation Book
( ) Instrument Pilot Written Exams
( ) Instrument Check Flight Book
( ) Private Pilot Written Exams
( ) Private Pilot Check Flight Book
( ) A & E Mechanic Practical Book
( ) Powerplant Mechanic Written Exams
( ) Airframe Mechanic Written Exams
( ) Flight Instructor Written Exams
( ) Flight Instructor Check Flight Book
( ) Airline Transport Pilot Exams
( ) Airline Transport Check Flight Book
( ) Flight Engineer Written Exams

ANY 4 $10.00 ANY 2 $ 8.00
ANY 3 9.00 ANY 1 5.00

ACME SCHOOL OF AERONAUTICS
MEACHEM AIRPORT
FORT WORTH, TEXAS

☐ Payment enclosed. ☐ Send C.O.D.
Please send items checked at left.

NAME
ADDRESS
CITY & STATE

IN NEW YORK...

"Touch Down"

WHERE SERVICE IS THE FINEST!

ZAHNS AIRPORT

AMITYVILLE, LONG ISLAND
Serving Greater New York

Hard surface runways 4200 • Unicom Teletype • Direct line to ATC and INSAC • Instrument approach ADF • Runway lighted all night

Air taxi • Charter flights

Rental cars

Gov't. approved Airplane and Helicopter flying school

Sales • Service • Storage

Tel: Amityville 4-4200

Atlantic Aviation

TETERBORO AIRPORT, N. J.
25 Minutes from Manhattan

Hangar storage • Free daylight parking • Esso products • Parts & supplies • Major repairs • Radio installation & service • Aircraft sales • Charter service • Limousine or rental cars • Restaurant • Motels • Helicopter service

Distributors of Beechcraft

Tel: Hasbrouck Heights
8-1740
8-0306

In Boston—stop at
ATLANTIC AVIATION
Logan Airport

COMPLETE SERVICE FOR PRIVATE AND CORPORATE AIRCRAFT

PIPER

USES FAMOUS

WAKMANN

AIRCRAFT CLOCKS

. . . respected and selected the world over for true watchmaker craftsmanship and time-tested reliability.

A-11 AIRCRAFT CLOCK—Standard seven jewel—8-day clock made in strict accordance with USAF specification MIL-C-7939A AN 5743-2, AN 5743L2, luminescent hands and figures, sweep second hand, exceptionally accurate, winds and sets from the front. Lightweight oxidized aluminum case. Available with long or short knob; also in 24-hour dial.

FREE catalog — Fine Aircraft Clocks
Write: Dept. FN

WAKMANN WATCH CO., INC.
15 West 47th St., N. Y., N. Y. Judson 6-1750

Qualified suppliers to Army, Navy, Air Force

STONER AVIATION CORRESPONDENCE SCHOOL

"Knowledge is Power"

108 Dupree Street, Bainbridge, Georgia
Under Contract to USAF
Specialized Training Program

Complete Home Study Courses Now Available

Don't cram for an exam. The knowledge necessary to pass CAA exams . . . and more important . . . the knowledge necessary for safe and proficient inflight and ground operations requires systematic, supervised, constantly revised, and thorough training. This training is now as near as your mailbox for all CAA ratings. All of these courses are prepared and presented by CAA licensed ground instructors who are currently employed as academic and pilot instructors at a USAF Primary Pilot Contract School. These courses cover all phases of each subject, step-by-step, and all students receive personal attention and counseling. These courses are excellent for CAA exam preparation, refresher training for licensed personnel, or preparation for pre-flight military training. Easy payment plan. Send the coupon today for full details.

Stoner Aviation Correspondence School

108 Dupree St., Bainbridge, Georgia

Name .....

Address .....

.....

I am interested in.....

SCOUTS CHARTER AIRLINER

Flying from Binghamton, N. Y., in their chartered Mohawk Airlines DC-3, these Air Scouts from Squadron 221, Vestal, N. Y., and Explorer Scouts from Post 90, New Milford, Pa., studied airline operations at Mohawk's Ithaca, N. Y., headquarters where officials showed them shops, offices and passenger facilities.

(Continued from page 77)

as 125 people have paid $2.50, plus tax, for a flight over San Francisco's Golden Gate, Alcatraz, and the fabulous Bay itself. Tourists and natives alike stand in line for a spot in the hustling *SeaBees*. Twenty thousand professionally prepared brochures, distributed at a San Francisco Sports and Boat Show, got this business off to a running start, a pace which is maintained by tasteful permanent signs on the hangar, visible from the highway.

Still another source of revenue for Commodore is its charter business. It is significant to note that the bulk of Commodore's charter work is for business utility only—the shipping company executive, the editor, the prizefight manager, for instance. The business is sold on its merits, quite apart from any idea of "supporting aviation." The State of California, as a matter of fact, is an enthusiastic Commodore customer. When the State took over an island in the Bay for a park, Commodore Air Service was retained to fly the park rangers and their families to and from their jobs. Flying time was just under five minutes. The State maintains Commodore's *SeaBees* were cheaper than boats would have been.

During the season, Commodore actually operates a scheduled airline. The *SeaBees* chop almost four hours from the time required to drive round-trip from San Francisco to northern California's Clear Lake. The flight substitutes a restful ride over beautiful country for a nerve-shredding battle with bumper-to-bumper weekend traffic. With five pick-up points at the lake and carefully planned schedules, the service has proved very popular and profitable.

Of course, a business like Commodore doesn't "just grow". As must any other business, an air service must render a service. And it must take a broader view than its own short-term self interest. That's why Bob Law is a director of his local Chamber of Commerce. That's why his planes are available for civic chores, flying officials over projected real estate developments, for instance—even including a recent survey flight to find the best location for a new garbage dump.

Aside from its interest as a success story, Commodore Air Service may be pointing out an obvious answer to private flying's troubles in metropolitan areas. There are few major population centers in the country which do not lie near flyable waters. Lakes, rivers and coastal indentations alike offer literally thousands of square miles of landing surface—a landing area which requires neither costly construction nor maintenance. Nor is it taxed. The higher cost of operating float planes is more than offset by the reduced cost in real estate investment. The float operator needs only enough space for dock, shop and office. His runways and taxi strips are the open water.

Could floats then be the answer for operators and owners in metropolitan areas where pilots have dropped flying as fields were engulfed by real estate sub-divisions? Could not the inherent safety of float flying be made a compelling argument to lure back those pilots who have become family men and who have lost their taste for the silk-scarf-and-riding-boots aspects of aviation?

What Bob and Alice Law have done on the waters of San Francisco Bay indicates that the answers to these questions is a hearty yes—not only for San Francisco, but for every big city area within reach of flyable waters. END

KEEP ACCURATE LOGS to the HOUR and MINUTE

HOBBS Aircraft Hour METERS never forget!

ENGINE HOURS

FLIGHT HOURS

New and Improved through continuing engineering research

Your logs are always accurate . . . and you KNOW when it's time for check-up and protective maintenance . . . with HOBBS Aircraft Hour Meters installed in your plane. Hobbs ENGINE Hour Meter indicates elapsed time and total time of engine operation. Hobbs FLIGHT Hour Meter with AIR SWITCH mounted on the wing records hours and minutes of actual flight.

THEY'RE AUTOMATIC!

These meters are accurate electric timing instruments—start and stop automatically. They're easy to install . . . simple to read. Ruggedly built by America's finest instrument makers. Weigh only 8½ oz. Positively will not interfere with radio reception. Fully guaranteed.

• WRITE FOR LOW PRICES AND LITERATURE

John W. Hobbs Corporation
2068 YALE BLVD. SPRINGFIELD, ILLINOIS
World's Largest Builders of Running Time Meters

At last . . .

LIFE INSURANCE . . .

For owners and pilots

Now - **PROTECTION WHEREVER YOU TRAVEL**

YOU OWE IT TO YOURSELF TO INVESTIGATE
TAKE YOUR CHOICE OF ANY STANDARD PLAN

NO AVIATION RESTRICTION COVERAGE
UNDERWRITTEN BY

HAVEN INSURANCE COMPANY
ST. PETERSBURG, FLORIDA

HAVEN INSURANCE CO. P.O. BOX 112, ST. PETERSBURG, FLA.
PLEASE SEND FULL PARTICULARS TO:

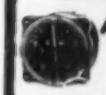
NAME _____
ADDRESS _____
CITY _____ STATE _____

SAVE UP TO 85% ON GOVERNMENT SURPLUS

Instruments shown below are only a small part of our tremendous stocks of Government Surplus Aircraft instruments and parts. We specialize in aircraft components such as all types Hydraulic Equipment – Cylinders, Pumps, Valves, AN-AC hardware, etc. Instrument stocks include those for Navigation, Pressure, Altitude, Fuel, Oil, Electrical, Stability, etc.

AIRSPEED INDICATOR

Standard equipment on Army & Navy Aircraft. Type C-14. Has an air speed range from 40 to 300 MPH. May be hooked-up to any type Pitot tube. Ideal for use on any small plane. A Surplus Bargain. . . . **12.50**



AIRCRAFT TACHOMETER INDICATOR AND GENERATOR

A Navy Type MARK V Tachometer Indicator. Designed for remote electrical operation with a tachometer generator. Range is 0 to 3500 RPM. Panel mount into 3" hole.

TACHOMETER INDICATOR **6.75**

TACHOMETER GENERATORS
2CM5AAK20, Gen. Elect. Stud Mt. 2 pin, Cannon connector. . . . **7.50**
2CM7AAB, Gen. Elect. Screw Mt. 2 pin, Cannon connector. . . . **8.50**

TYPE B-16 MAG. COMPASS

A direct reading, panel mounted, lighted aircraft compass. Card is graduated in 5° increments. Reads to a fixed lubber line. Has built-in, screw type compensators. Face dia. 3-1/8", wt. 24 ozs. **12.75**

AMMETERS 0-30

NEW! Made to rigid Government Specs. . . **4.95**

BANK & TURN INDICATOR

Maintain proper turn position & level flight. Has built-in bell and liquid level. Operates off of vacuum pump. 3" dia. face. In excellent condition. **12.50**

AIRCRAFT GENERATORS

Finest precision built aircraft generators. Made to Gov't specs. Compound wound for continuous duty. We've sold thousands.

E-5A – 50 Amp, 15 Volt. Reconditioned. **17.50**
310-27 – 50 A., 15 Volt NEW **19.75**

RATE OF CLIMB INDICATOR

Type C-2 Kollsman. Gives rate of climb from 0 to 6000 feet. Operated from static side of pitot tube. Requires no pressure or vacuum power. Also shows rate of descent. Diaphragm type **17.50**

Pioneer ALTIMETER

Ideal for all types aircraft. Has a range from 0 to 35,000 feet in increments of 20 ft. Barometric dial in inches of mercury. Can be adjusted to barometric pressure in any area to compensate for height above sea level. **12.50**

NEW NAVY AN5854-1 SEXTANT

Made for Navy Bureau of Aeronautics by Bausch & Lomb. For use in aerial navigation. Small, compact, easy to use. Has visible dial for reading degrees and minutes from 0 to 90. Bubble is illuminated by flashlight. Complete with reconditioned bubble, extra bulbs and in a special shockproofed carrying case. **17.50**

GENUINE NEW AN-6530 AIRCORPS GOGGLES

New – with precision ground and polished, interchangeable lenses. Choice of 3 lens colors – Clear, Amber or Green. Frames are rubber covered with a soft chamois lining and built-in, non fogging lens ventilators. The nose bar is adjustable for added comfort. WINDPROOF – DUSTPROOF! With elastic headband. Genuine Air Corps Surplus. Please specify which lens color desired. . . . . ONLY **2.79**

EXTRA LENSES – Specify Clear, Amber or Green **1.00**

ORDER FROM THIS AD – Pay by Money Order or Check. 1/2 deposit with C.O.D.s. Purchase orders accepted from well rated D&B firms. All prices are F.O.B. our warehouse in Los Angeles, California.

PALLEY SUPPLY CO.

2263 EAST VERNON AVE. DEPT. FT-11 LOS ANGELES 58, CALIF.

JAVELIN RUDDER TRIM

CAN THE RUDDER OF YOUR AIRPLANE USE A "GENTLE TOUCH"

REDUCE FATIGUE OF CROSS-COUNTRY FLYING AS MUCH AS 50% BY INCORPORATING RUDDER TRIM INTO YOUR AIRPLANE

Trim position electrically adjustable for the pilot's convenience and ease of installation.

This installation is CAA approved and is listed in the airplane specifications.

Available for Cessna model 170 and 180 series aircraft, Mooney M-20

$168.00
F.A.F. Wichita, Kansas

Javelin AIRCRAFT COMPANY, Inc.
1405 S. OLIVER WICHITA, KANSAS

USE THIS AD TO ORDER

CIRCLE ITEMS & MAIL WITH YOUR NAME & ADDRESS

DIRECTIONAL GYRO

Gyro Compass. Vacuum operated from either 4" venturi or engine vacuum pump. These surplus instruments are all checked for serviceability before shipment. Mfg. by Sperry Gyroscope.....$27.50
Model AN5735-1. New CAA Overhauled, Dated and Certified in approved shop.....$57.50

ARTIFICIAL HORIZON

Gyro Horizon. Sperry Non-caging Vacuum Operated Model. Uses 4" venturi. Surplus or Service overhauled. Checked for serviceability before shipping.....$27.50
Model AN5736-1 Caging. New CAA Overhauled, Dated and Certified.....$57.50

OUTSIDE AIR TEMPERATURE KIT

Indicates outside air temperature on 2¼" gage. Fits in instrument panel. Complete with temperature bulb, gage, wire, connectors, instructions, etc. Specify 12 or 24 volt.....$18.50

RECORDING BAROGRAPH

Bendix-Friez standard recording Barograph Model 1620. Measures and records barometric pressure on revolving clock driven drum chart. Can be set to record for either one day or one week. Housed in attractive desk top glass sided case with carrying handle $49.50

WINDOMETER MODEL AC-3

Wind Speed, Wind Direction and Temperature. New model measures even variable winds to 100 MPH and 85 Knots —40° to 120°F. temperature. Calibrated in both MPH and Knots on same easy-to-read dial. Used by pilots, airports, and airlines, marine, civil defense and industry. Easily installed, complete kit includes outside transmitter unit, beautiful natural finish blond wood desk top indicator unit, lead-in cable, instructions, etc. Operates on both 110V. A.C. and 12V. D.C. (Makes a wonderful gift, too).....$99.50

REMOTE INDICATING COMPASS KIT

The popular remote indicating compass Model AN5730-1 is more stable than the magnetic compass, yet doesn't drift like a gyro. Complete kit weighs less than 6 lbs. Everything furnished including instructions. Easy to install. For all 12 volt airplanes.....$57.50
24 volt kit.....$47.50

TURN AND BANK KIT

Vacuum operated Model A-8 Turn & Bank, Needle Valve pressure regulator, rubber hose, fittings for use on engine intake manifold. Complete, everything needed-all Brand New.....$24.00

CARBURETOR AIR TEMPERATURE KIT

Small 2¼" gage, AN5525-1 temperature bulb, connectors, wire, instructions. Complete kit fits any carburetor, easily installed. Specify 12 or 24 volts.....$18.50

NAVIGATION COMPUTERS

Dalton Aluminum E6B Style computer—for knee mounting or hand use. Speed, time, distance, air speed and altitude corrections. Thousands sold.....$ 5.00

LIGHT PLANE BATTERY

12 Volts, 17 ampere hours rating, 6" x 5½" x 8¾" high. Dry charged in metal case with non-spill vent caps. Weighs only 27 lbs. Perfect for light aircraft.....$14.95

CYLINDER HEAD TEMPERATURE KIT

Standard 3¼" gage, thermocouple leads and spark plug thermocouple. Easily installed, does not require connection to the aircraft electrical system. Complete, everything needed including instructions. All brand new, specify 14mm or 18mm or part number of spark plug.....$15.00
Dual type instrument, 3¼" gage, two thermocouple leads and two thermocouples. Complete instructions, etc. Specify 14mm or 18mm.....$19.00
New small size 2¼" gage complete with leads and thermocouple. Reads 0-350°.....$27.50

Write Today. *Free Catalog!*

Please enclose sufficient postage, any excess will be promptly refunded.

AVIATION'S LEADING SUPPLY HOUSE
AIRCRAFT COMPONENTS, INC.
Dept. F • Benton Harbor, Michigan

NOVEMBER 1955 ADVERTISERS INDEX

Acme School of Aeronautics 77
Aero Design & Engineering Co. 83
Aeronautical Electronics 69
Air Associates, Inc. 7
Aircraft Components, Inc. 80
Aircraft Owners & Pilots Association 71
Aircraft Radio Corporation 64, 65
Aircraft Specialty Lines 83
American Airlines 19
American Flyers 73
Atlantic Aviation 77

Bateri Computer Company, Inc. 64
Beech Aircraft Corporation 81
Bowers Battery & Spark Plug Co. 79

Cessna Aircraft Company 55
Champion Aircraft Corporation 16
Convair, a Div. of General Dynamics 17
Criterion Company 65

Desert Air Hotel 67

Eastern Air Lines 76
Edo Corporation 14
Embry-Riddle School of Aviation 61
Esso Aviation Products ..... Third Cover

Fairchild Engine & Airplane Corp. ..... Second Cover
Flite-Tronics, Inc. 76
Flying 66
Flying Equipment Sales 75
Flynn, Dr. John T. 75

Gaaco Supply Company 64
Goodyear Tire & Rubber Co., Inc. 3
Grunbart Aviation 62, 69

Hanover House 72
Haven Insurance Company 79
Hiller Helicopters 74
Hobbs Corp., John W. 79
Holladay Aviation 67

Indiana Technical College 64

Javelin Aircraft Company, Inc. 80
Jones Box Corp., Jesse 68

Kane Aero Equipment Company 80

Lockheed Aircraft Corp. 8, 9
Loral Electronics Corp. 15
Lubar-Gydo, Inc. 72

Mercury Flying Service, Inc. 70
Merlite Industries, Inc. 72
Met-Co-Aire 82
Munk Aeronautical Laboratories, Inc. 75

National Aeronautical Corporation 68
North American Companies 59
Northrop Aeronautical Institute 12, 54, 75

Palley Supply Co. 79
Pan-American Navigation Service 70
Parks College of St. Louis University 62
Pilots Employment Agency 72
Pilot's Pal 68
Pinellas Aviation Service, Inc. 70

Republic Aviation Corp. ..... Fourth Cover
Ross Aero Publishers 73

Scott Aviation Corp. 58
Shannon School of Aeronautics, Inc. 69
Socony Mobil Oil Company, Inc. 11
Southwest Airmotive Co. 67
Spartan School of Aeronautics 56
Springer Aircraft Radio Co., Earl W. 72
Standard Oil of California 53
Stoner Aviation School 78

United Air Lines 60
U. S. Air Force 57

Vest Aircraft & Finance Co. 62, 63

Wakmann Watch Co., Inc. 78
Weems System of Navigation 16, 63
Welsch Aviation Company 66
White Plains Watch Co. 73
Wilcox Electric Co. 5
Wold, William C. 67

Zahns Airport 77

PHOTO CREDITS

10—BELL AIRCRAFT CORP., JANE MORRIS, PORT OF NEW YORK AUTHORITY
12—M. M. GRAY
14—KORDAY STUDIO
18—JEAN RAEBURN
22, 23—CAL ANG
24, 25, 26—UNIV. OF ILLINOIS
27—GEORGE WHEELER
28—USAF, U.S. NAVY
29—U.S. NAVY
30—USAF, U.S. NAVY, U.S. ARMY
31—USAF, BOEING AIRPLANE CO.
32—U.S. NAVY, MARTIN AIRCRAFT, U.S. ARMY, CONVAIR
33—U.S. ARMY, CONSOLIDATED VULTEE AIRCRAFT CO., BOEING AIRPLANE CO., U.S. ARMY
36—R. E. SMALLMAN, BOB BLACK
38, 39—USAF
43—USAF
44, 45—USAF
46—BELL AIRCRAFT CORP., BRITISH INFORMATION SERVICE
47—JACK RICHBURG, KELLETT AIRCRAFT CORP., BRITISH INFORMATION SERVICE
49—TWO STAR
52—DANIEL S. ZUDELL, DON KELLAR, DANIEL S. ZUDELL
60—BELL AIRCRAFT CORP.
66—N. MATSUMURA
74—USAF, C. L. HAMILTON

Classified Advertising

NOTICE: Rates, 30¢ per word. Minimum 10 words. January issue closes November 3rd. Send order and remittance to FLYING, 366 Madison Av., N. Y. City 17.

AIRPLANES FOR SALE

AERO COMMANDERS

COMMANDERS: 8 from $43,175. Model 560, #XPJSBF, has 250 hours. Exceptional radio. DME. Extras. New condition. Cost over $80,000. Asking $71,600. Trade for Apache. Powers & George, 475 Fifth Avenue, New York, N. Y.

BEECHCRAFT

BONANZAS: 10 from $6250. Painted model 35, #ZSFXQF, has 205HP, 175 hour engine. Auxiliary tank. Reupholstered. Gyros. LF. ADF. Omnigator. $6900. Make offer. Also; Painted A-35, #ZFQRAF, with new 205HP engine and propeller. Gyros. LF. Omnigator. $8750. Also; Painted B-35, #ZZFSAF, with 300 hour engine. Auxiliary tank. Gyros. LF. VHF. ADF. Extras. $10,000. Also; C-35, #RZGJCF, with 310 hours. Engine majored. Gyros. LF. Omnirange. $12,500. Also; D-35, #XTXZGF, with 260 hours. Auxiliary tank. Gyros. LF. Omnirange. ADF. Extras. Bargain. $15,000. Powers & George, 475 Fifth Avenue, New York, N. Y.

TWIN Bonanza: 1954, 260HP, #11F, has 470 hours. LF. VHF. ADF. Factory relicensed. $70,000. Offer wanted. Powers & George, 475 Fifth Avenue, New York, N. Y.

BELLANCA

CRUISAIRS: 8 from $2700. 1946, #ZPJRZF, has 800 hours, engine 350. Small fins. Outside baggage door. Aeromatic. Gyros. Radio. Clean. $3000. Powers & George, 475 Fifth Avenue, New York, N. Y.

CESSNA

170's: 8 available. 1950 170A, #TTGGAF, has 800 hours, engine 250. Extra instruments. Stall warning. Radio. Clean. Undamaged. Hangared. $4700. Also: 170B, #XFSPDF, with 545 hours. Primary blind. Stall warning. Omnirange. Excellent. Bargain. $5325. Powers & George, 475 Fifth Avenue, New York, N. Y.

180'S: 5 available. 1953, #XZTQAF, has 845 hours, engine 441. Painted 1954. Gyros. LF. Omnigator. Extras. Undamaged. Hangared. Bargain. $8900. Powers & George, 475 Fifth Avenue, New York, N. Y.

170—1948—EXCELLENT condition—$3700. Thomas Johnson, 15 Payne Whitney Lane, Manhasset, N. Y.

DEHAVILLAND

DOVES: 6 from $65,000. #FTRJN, has 20 hours since mark 2 engines installed. Payload increased, and all late modifications made. Good radio. Extras. New condition. Bargain. $70,000. Powers & George, 475 Fifth Avenue, New York, N. Y.

GRUMMAN

SUPER Widgeon: McKinnon 1954 conversion, #RZGGJF, has 250 hours. 260HP Lycomings. Three-bladed feathering propellers. L-2 automatic pilot. Exceptional radio. Leather executive interior. Beautiful throughout. $60,000. Make offer. Powers & George, 475 Fifth Avenue, New York, N. Y.

GOOSE Amphibians: 6 from $46,000. Excellent selection. Several zero since overhauled. Powers & George, 475 Fifth Avenue, New York, N. Y.

PIPER

TRI-PACERS: 5 from $4400. December 1954, #GPQQAF, has 320 hours. Gyros. LF. Omnirange. Hangared. Undamaged. Super Custom 135HP. All bulletins. Airline Captain only owner-pilot. Sacrifice. $5000. Powers & George, 475 Fifth Avenue, New York, N. Y.

1954 TRI-PACER 135: Super Custom Caribbean; 360 Hours; Narco Superhomer, LF/MF Receiver; Full Panel; Always Hangared; Right Wing Damage Repaired With Factory Kit; Reasonable; Dick Morris, Norfolk Municipal Airport.

APACHES: 6 available. December 1954, #QSQRPF, has 228 hours. Usual DeLuxe radio, instruments, equipment. Hangared. Undamaged. Excellent. $32,000. Make offer. Powers & George, 475 Fifth Avenue, New York, N. Y.

NAVIONS

RYAN, 1948: 205 hp. 670 hrs. frame, 50 hrs. engine. Full military panel, gyro, horizon etc. Narco Omni, vhf trans-receiver; RCA vhf trans-receiver; military ADF; aux. 20-gal. tank, cabin heater and cool air scoop; exterior battery terminals. Perfect condition, all bulletins and mods done, always hangared. I hate to sell this very wonderful ship but have bought twin. $9000. John Pitt, 5157 Sherbrooke, W. Montreal.

NAVIONS: 21 available. 1946, #TQQXJF, has 205HP, 171 hour engine. Gyros. Reupholstered, repainted, relicensed June. Auxiliary tank. Omnirange. $6850. Also; 1949, #XTKF, with 300 hours. New engine. Auxiliary tank. Gyros. Omnirange. Bargain. $8190. Also; 1948, #FXJSKF, with new 225HP engine. Gyros. Omnigator. $9300. Also; Super 260HP, #RQTXKF, with 301 hours on engine. Gyros. Loop. Omnirange. Bargain. $8500. Powers & George, 475 Fifth Avenue, New York, N. Y.

STINSON

STINSON 150 Lear VHF, Metal Prop TT878 SMOH25 Lic 2/56 P. Munson 39 Monterey Ave., Hamden, Conn.

165'S: 11 from $3000. #TPSSKF has 230 hour heavy crankcase engine. New metal propeller, brakes, tires. Fabric good. Flares. Gyros. LF. Loop. Omnirange. Hangared. Relicensed April. $3295. Powers & George, 475 Fifth Avenue, New York, N. Y.

AIRPLANES MISCELLANEOUS

$2.00 CAN save you hundreds. It's New! Now you can receive information each month on hundreds of aircraft for sale throughout the United States. At a glance you will know what is available, hours, date licensed, price, etc., of practically every type of airplane manufactured. We tell you who owns the aircraft and you deal direct, saving time, eliminating hours of travel, and by knowing the market you get the best deal possible. You can receive your first copy listing aircraft for sale immediately. Don't wait! Send $2.00 Today for a full year's subscription. Flyers' Market, published by Aircraft Listing Bureau, 5305 Congress Street, Chicago 16, Ill.

FOR Sale 1929 "Fledgling." Curtis-Challenger powered. In good flying condition since recently completing a cross country flight. License No. N 868 N. Contact Lamb Aviation, East Hampton, L. I., New York.

FOR Sale No. 1850 EDO Floats complete with fittings. Any reasonable offer accepted. Contact Lamb Aviation, East Hampton, L. I., N. Y.

FOR Sale: "Argyle Scooter Cub"—Collapsible, lightweight scooter. Aviation's only ground transportation. Mfg. and sold by Treo Corporation, 550 North Coal Street, Colchester, Illinois. Price $245.00.

TWO-Place Stits "Flut-R-Bug" Prefabricated kit, only $995.00. Free literature. Box 2084-F, Riverside, California.

AIRPLANES WANTED

OLD Biplane, Preferably Hisso Powered, Travel Air, Waco or Eaglerock, any condition. Others Considered. Will Haul. Shelby Hagberg, Mapleton, Iowa.

POWERS & George, Aircraft Brokers, 475 Fifth Avenue, New York, N. Y., have buyers for all aircraft from $2000. No listing charges. Write, describing yours.

PARTS & ACCESSORIES

WORLD'S largest stock new and used aircraft parts, engines and supplies. Free lists. Financing. Vestco, Dept. D, 5306 T.A., Denver, Colo.

TRADE your wood prop on a new met-l-prop. This is a good deal. Luther Parts, Johnstown Airport, Johnstown, Pa.

FAST Service on Met-l-props. Scott products, Goodyear products. Bowers and Reading Batteries. Luther Parts, Johnstown Airport, Johnstown, Pa.

AVIATION EQUIPMENT

NEW 1955 "Mark VIII-C improved Dead Reckoning Computer with instructions, pocket size only $2.50;" New E-11 pocket size high speed, high Altitude Computer $5.00; New "Airlines Computer" (successor to American Airlines Computer), $9.00; "Batori Pilot's all metal Computer" $15.00; Pressure Pattern Drift, $2.50; leg-strapped Model G, $7.50; New E-6B, $10.00. Free Catalogue. Pan American Navigation Service, 12021-B Ventura Blvd., North Hollywood, Calif.

E-6B Computers, (Dalton, $10.00 value) with 30 page illustrated direction manual and leather case: like new plastic $4.90, new $6.50; metal back like new $5.90, new $8.90; model "G" metal knee type new $4.75 ($35.00 list). Sextants, bubble averaging with case ($300.00 value), like new Fairchild or Link $16.85. Kane Aero Equipment Co., 2308 N. E. 23rd St., Oklahoma City, Oklahoma.

ADD VHF to your LF transmitter with Aerotron transmitter, only $79.50 including five crystals. Mention FLYING, get $10.50 installation kit Free. Receive VHF on LF receiver with Gonset Adaptor, only $69.50. Mention FLYING, get $8.50 installation kit Free. Send check, we prepay. Weiss-McNichols, 424 So. Kenilworth, Oak Park, Illinois.

FREE catalog describing famous Weems navigation aids and instruments. Send today. Weems Mark II Plotter (statute mile) $2.00; Weems Mark II N Plotter (nautical miles) $2.50; Dalton E-6B Computer $10.00; new Casey-Myers Computer $4.00; Link Bubble Sextant $37.50; many navigation books including new Weems Air Navigation $6.00; Flying the Omnirange, Zweng $4.00; Electronic Navigation, Orman $4.50; Learning to Navigate, Weems and Eberle $2.00; Star Chart, Illyne $1.00; complete line of government charts and publications. Do as other navigators, pilots and students do. Select your navigation aids and instruments from the Weems Catalog. Send for it today. Address Department 12, Weems System of Navigation, Annapolis, Maryland.

BUY Surplus Aircraft; Fuselages; Accessories; Aircraft Engines; Assemblies; Parts; Instruments; Test Equipment; Electronics; Radio; Radar Equipment & Parts—Millions in Surplus Available Direct From Government—Rush $1.00 For U.S. Depot List & Procedure To Bid—Brody, Box 8-BG, Sunnyside 4, N. Y.

PATENTS

INVENTORS. When you are satisfied that you have invented something of value, write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers, Registered Patent Attorney, 912 Columbian Bldg., Washington 1, D. C.

INVENTORS. Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 218 Columbian Bldg., Washington 1, D. C.

CHARTS & MAPS

WORLD coverage of all current aeronautical maps and charts. Agents for Coast & Geodetic Survey, Hydrographic Office, Air Force. Free catalogue available. Pan American Navigation Service, 12021-8 Ventura Blvd., North Hollywood, Calif.

LOG BOOKS

STEELE'S Pilot Log $1.50; Pilot Flight Record Log $1.00; Senior Pilot Log $5.70; Airline Pilot Log $5.70; Air Stewardess Log $2.00; Air Navigator Log $2.00; Flight Engineer Log $2.00; Aircraft Log $1.50; Engine Log $1.25; Pilot Progress Rating Log $1.00. (Free Catalogue.) Pan American Navigation Service, 12021-8 Ventura Blvd., North Hollywood, Calif.

INSTRUCTION

OPERATORS, Instructors, Schools: prepare your students for the top—with Zweng Manuals. Complete Texts, latest typical examinations. Free catalogue. Aeronautical and Marine, discount sheet. Pan American Navigation Service, 12021-8 Ventura Blvd., North Hollywood, Calif.

LEARN To Fly with the Air Cadets. Men 17-22 get $81 a month, a free college education. High school unnecessary—equivalency accepted. Prepare for Air Force Academy entrance examinations with genuine Cramwell tests and answers. Required: Flight Aptitude, $3.25; General Education, $3.25. Both sets $5.00. College and High School Equivalency tests, $5.00. All three sets, $8.75. Prepaid. Cramwell Publications, Air Institute, Adams, Mass.

IT'S Easy to learn a language by Linguaphone. World's Standard Conversational Method. At home, quickly, easily, naturally learn to speak French, Spanish, Japanese, German, Russian—your choice of 34 languages. It's like living in another country. Complete Recorded Courses on Free Trial. Try—Don't Buy! Send for Free Book and Details—No obligation. Linguaphone Institute, T-128-115 Radio City, New York 20.

AIRCRAFT Drafting and Detail Design "home-study" courses. Free Informational Circular. Aero Technical Institute, 2162-11 Sunset Blvd., Los Angeles 26, California.

FOR all CAA exam preparation—complete correspondence courses. See our advertisement in this issue of FLYING. Stoner Aviation Correspondence School, 108 Dupree Street, Bainbridge, Georgia.

AVIATION BOOKS

WARNING—CAA examination is being changed: It takes more than questionnaires to prepare you for the new "open-book" CAA examinations. You need the text and background material that only the authoritative, up-to-date Zweng Manuals provide. Used by aviation schools throughout the world. Fully illustrated, each manual averages more than 300 pages, with latest examinations, too. There's a proven Zweng Manual for each rating: "Helicopter Rating" (new edition), $5.00; "Commercial & Private Pilot Ratings," both for $4.00; "Instrument Rating," $5.00; "Airline Transport Pilot," $5.00; "Flight Instructor", 1955 edition, $5.00; "Flight Engineer," $5.00; "Aircraft Dispatcher," $5.00; "Link Instructor," $4.00; "Parachute Technician," $3.00; "Aircraft & Engine Mechanics," 1955 edition (including hydraulics, weight & balance) and new "Electrical Examination," $5.00; Meteorology for Airmen with examination (Zweng), $3.00; "Manual of the E-6B Computer," $3.00; "Rules of the Air," indexed illustrated up-to-date, $2.00; "Ground Instructor, Basic" and "Ground Instructor Rating, including examinations," $4.00 each, prepares you; "Flying the Omnirange," $4.00; "Encyclopedic Aviation Dictionary," $6.00; "Electronic Navigation, radar and loran" (Orman), $4.50; "Air Navigation," 1955 Gold Medal Edition (Weems) prepares for Navigator Rating, $6.00. We supply any book by other publishers, including: "Jet Aircraft Power Systems," $6.50; "Radio Operator's License," $6.60; "Psychology of Flight," outstanding $4.25; "Stick and Rudder" (Langewiesche), $5.00; "Crop Dusting" (6 manuals), $12.50; "Airline Piloting," $3.00; "Safety After Solo," $3.50. (Free Catalogue.) Pan American Navigation Service, 12021-8 Ventura Blvd., North Hollywood, Calif.

BUILD Your Own Sport Plane. Plans for 3 Different. Parts Supply Sources. Regulations; And Flying Lessons. All For $1.00. Richmond Enterprises, Box 3274, Augusta, Ga.

NEW CAA exams! ! ! ! Did you know that the CAA has recently changed their exams? They are now using a new type "Open Book Exam" on some of their examinations. Obtain your CAA Licenses by using a new Ross Guaranteed Questionnaire which includes the new "Open Book" type examinations. Our frequent revisions insure your receiving the latest Exams including navigation and meteorology maps. Order today: "Commercial Pilot" $5.00; "Instrument Pilot" $5.00; "Airline Transport Pilot" $5.00; "Flight Instructor" $5.00; "Private Pilot" $1.00; "Engine Mechanic" $4.00; "Aircraft Mechanic" $4.00; "Flight Engineer" $5.00; "Ground Instructor" $5.00; "Parachute Rigger" $4.00; "Control Tower Operator" $4.00; "New CAR for Pilots" 50c. Special Limited Offer! A complete Ross Library consisting of the above 12 books for only $15.00. This introductory offer is for a limited time only, so take advantage of its savings today! Order Postpaid or C.O.D. Direct from Ross Aero Publishers, Box 7071F, Municipal Airport, Tulsa, Oklahoma.

BOOKS of all publishers, including the Government. Aviation, Technical; elementary, advanced. Largest selection of aviation books in the world! Some of the most popular are: "Civil Air Regulations for Pilots" $1.75; "Complete Book of Helicopters" $4.95; "Aero Mechanics Questionnaire" (2000 questions) $5.00; "Radio Amateur's Handbook" $3.50; "Aviation Dictionary & Reference Guide" (the standard authority) $7.50; "Air Corps Practice Tests" $3.00; "Basic Aeronautics" $4.50; "Model Jets & Rockets for Boys" $2.50; "Jet Aircraft Simplified" $3.75; "Development of the Guided Missile" $4.75; "Standard Aircraft Handbook" (factory practices) $1.50; "Observer's Book of Aircraft" $1.25; "Civil Air Regulations for Mechanics" $2.00; "Aircraft of the 1914-1918 War" $11.95; "Aircraft Weight, Balance & Loading" $3.25; "World's Famous Racing Aircraft" $1.50; "Questions & Answers for Flight Instructors Rating" $1.00; "Jet Aircraft of the World" $6.95; "Aircraft Template Development" $4.00; "Aircraft Identification Posters" (120 large posters of WW-II aircraft) $5.00; "Rocket Encyclopedia" (available January) pre-publication price $8.50; "Aircraft Maintenance & Repair" (Northrop Institute) $8.00; "Fundamentals of Stress Analysis" $3.50; "Airport Directory" $3.00; "Pilot's Deluxe PL-8 Logbook" $3.00; "Elements of Electronics" $6.50; "Aircraft Electricity for the Mechanic" $5.00; "Industrial Inspection Methods" $6.00; "Inside the Space Ships" $3.50; "Plane Parade" (Aircraft Recognition Game) $1.00; "Solution of Equations" (basic math & problems) $3.00; "Air Navigation" (Weems) $6.00; "Pilot's Weather Handbook" $1.25. Order books C.O.D., or send money with order plus 3% postage and save C.O.D. fees. Satisfaction guaranteed on all purchases. Free 1956 Catalog lists hundreds of books, magazines, publications. Aero Publishers, Inc., 2162-11 Sunset Blvd., Los Angeles 26, Calif.

SITUATIONS WANTED

COMMERCIAL Pilot—Single and Multi Engine Land and Flight Instructor—age 34, married, two children—employed executive position with a bank, desires position where executive and flying ability can be utilized. Box 756 c/o FLYING.

BUSINESS Aircraft Captain Available Immediately. 13 years experience. 7 years Chief Pilot of Business Aircraft Operation. Excellent References. Box 757 c/o FLYING.

SALESMAN Pilot Com. Single-Multi-Eng. Instrument and Instructor Ratings 3000 Hrs. Age 35 With Proven Top Sales Ability Desires Opportunity. Ralph J. Anderson, 604 Delwood, Tulare, California.

COMPANY Pilot to work also as design or development engineer. Background of 2200 hrs pilot time, commercial license S&ME instrument. Ten years experience in design and development of automatic machines, three years college. Additional information on request. Box 758, c/o FLYING.

BUSINESS OPPORTUNITIES

START your own aviation business with little capitol. 47 opportunities. Details free. Christopher Publications, Holtsville 1, N. Y.

AVIATION Operators: Many operators are increasing their income by stocking Zweng texts and general aviation supplies. Apply for a Dealership now. Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood, Calif. (Free Catalogue.)

AVIATION Jobs—Names and Addresses of companies to contact. $1.00. Fitzgerald, (Chicago Division), Dept. A-1, 815 Countryside Drive, Wheaton, Illinois.

$200 WEEKLY cleaning Venetian Blinds. Free book. Burt, 2434AD, Wichita 13, Kansas.

BUY Wholesale, 25,000 Items. Catalog 25c. Matthews, 1472-82 Broadway, NYC 36.

HELP WANTED

AVIATION Jobs—Names and Addresses of companies to contact. $1.00. Fitzgerald, (Chicago Division), Dept. A-13, 815 Countryside Drive, Wheaton, Illinois.

CONFIDENTIAL Reports on best paying opportunities in foreign and domestic employment for skilled and unskilled. All occupations for men and women. Special reports for pilots and all aviation specialists with Airlines, Feederlines, Aircraft Factories, Cropdusters, Corporation Aircraft. Listings in construction, government, oil, mining, shipping and many other fields. Includes Europe, South America, Japan, Spanish Airbases, Alaska, etc. Application Forms and other necessary information. All for only $2.00, including one-year registration-advisory service. ($2.25 Airmail) Satisfaction guaranteed or money back. Best jobs go to those knowing who to contact. Act Today. Research Services, Box 2904-FQ, St. Louis 17, Missouri.

PILOTS: A & E mechanics; Aeronautical engineers, draftsmen, designers; Airline flight engineers; navigators; ticket, reservation, cargo agents; stock clerks; teletype operators; meteorologists; radio operators, technicians; electricians; Aircraft factory workers, assemblers, tool designers, machinists. All aviation specialists, trainees. $2 brings latest reports on world-wide aviation employment opportunities. Aviation Employment Information Service, Holtsville 5, N. Y.

MISCELLANEOUS

DIRECTION finding outfit for aircraft receivers—$19.50 complete. Operator's and Dealer's discount. Weiss-McNichols, 424 So. Kenilworth, Oak Park, Illinois, Dept. FM.

PHOTOS of aircraft from Wright Biplane to latest jet. Send dollar for 52-page illustrated catalogue, supplement and 6 photos. Aeroplane Photo Supply, Box 195, Toronto, Canada.

AIRCRAFT photos and books. Private collection to be sold by mail order auction. Many valuable items. Send for free bid sheets. R. J. Meisner, 325 East Piper Avenue, Flint 5, Mich.

AMAZING—New four-bladed boomerang, designed by aircraft engineer, soars to great heights and returns. Fascinates young and old. $2. postpaid. American Boomerang Co. P. O. Box 521, Boulder City, Nevada.

ATTENTION Pilots: get the magic multiplying Pencil. No computing, no figuring, no errors. The answer is there for you absolutely correct. Send $1.00 to Wilbur Jones Jr., 835 Wheeler Rd., Saginaw, Mich.

LEATHER Insignia: World's greatest selection. All designs are superimposed on triple A grade calf (black or tan) with your name combined at no additional charge. Wings: All Air Force and Navy, CAP, Aopa, Army, Liaison, Glider, Service, Civilian Civilian Instructor and many others. Also Paratroop, Airborne, Infantryman's Badge, and all grades and ranks from PFC to Colonel in appropriate color. Please print name and color preference with your order. Prices: Wings—2 for $1.00, Rank Insignia $1.00 per pair. Plain name "stripe" 3 for $1.00. Personalized Insignia Key Cases $1.00. Unconditional guarantee. Universal Insignia Co., P. O. Box 901, Graham Air Base, Marianna, Florida.

MICROMATIC cylinder honing machine. 3.875 to 6.125 Semi-production model. M. Matrician, 6815 Brownsville, Houston, Texas.

PILOTS! Will your name be listed in the new Aircraft Pilots Register? See our display ad in this issue. Lubar-Gyde, Inc.

PRINTED IN U.S.A.

Moving the conference table 800 miles

DE HAVILLAND DOVE

When the management group of the R. Company confronts important problems of production at one of their plants 800 miles away, they go right to the plant concerned. They can best solve the problems right on the spot. Their company plane gets them there fast, comfortably, and free of restricting schedules.

They will land at one of over 600 Esso Dealer Airports. Their pilot will produce his Esso Aviation Credit Card, which entitles the company to charge high quality Esso Aviation fuels and lubricants, tire and battery service, landing fees, overnight storage in transit, and minor emergency repairs.

Business and pleasure flyers are learning more and more to depend on Esso Aviation Products — used by the world's largest airlines and backed by over 45 years of flight testing and research.

ESSO

AVIATION PRODUCTS

SOMETHING
is happening at M.I.T.
We're happy to know that the same accelerated pace is taking place at every engineering school throughout the land. It means that today's aeronautical developments demand technological skills which have no precedent.
The striking power of a fighter plane depends upon the competency of those who designed it. Republic's engineering resourcefulness created the first U.S. 400 ...500...and 600 mile-an-hour fighters, it gave the war famed Thunderbolts and Thunderjets of war tested worthiness their powerful punch and ruggedness.
Current proof of staff proficiency and projected thinking are demonstrated in the F-84F Thunderstreak ... atomic-bomb-carrying jet-fighter-bomber, and its photo reconnaissance counterpart the RF-84F Thunderflash ...presently flying with units of the USAF and the NATO Air Forces.
We feel confident that whatever the trend of tomorrow's airpower needs may be, alertness to new techniques should add a potent blend when mixed with the skill of those veterans who have established Republic's reputation.
REPUBLIC AVIATION
FARMINGDALE, LONG ISLAND, N. Y.
Designers and Builders of the Incomparable